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**Psychosocial Predictors of Smoking Cessation
Among Hospitalized Pneumonia Patients**

by

Patti Seed



A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment
of the requirements for the degree of Master of Science in Health Promotion Studies

Centre for Health Promotion Studies

Edmonton, Alberta

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September 16, 2003

Abstract

The purpose of this study was to examine the impact of psychosocial variables and smoking cessation literature on smoking cessation for patients hospitalized with community acquired pneumonia. Smoking characteristics and psychosocial variables (quitting self-efficacy, social support, stress, nicotine dependence, readiness to quit, and perception that hospitalization is due to smoking) were measured at baseline within a group of smokers hospitalized with pneumonia (n=24) and a comparison group of smokers hospitalized with a non-lung related condition (n=23). Both groups of patients were provided with a minimal intervention consisting of two smoking cessation brochures. Self-reported reduction in smoking and patients' perceptions of the smoking cessation literature were assessed at two month follow-up. Results showed that patients in the pneumonia group reduced their smoking more at follow-up, compared to the comparison group, and across both samples that patients' perceived stress and the amount of support from their doctor were significant predictors of reduction in smoking at follow-up. Just under two thirds of the entire sample read the smoking cessation literature. Forty-eight percent (48%) of the patients did not find the information helpful, while 22% commented that the brochures were useful.

Dedicated to my loving and supportive husband, Chad

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Chapter One

Background and Literature Review

Cigarette smoking is such a pervasive behavior worldwide that it has been labeled an epidemic (Britton, 1997). The literature abounds with research investigating numerous smoking cessation interventions and techniques. Why should so many human and financial resources be used for research when over 6 million people in Canada smoke (Health Canada, 1999)? Because the association between smoking and morbidity and mortality rates is clear and compelling. Health Canada (1996) indicates that smoking is the number one preventable cause of death and disease in Canada. Smoking is strongly associated with illness and death arising from respiratory, cardiovascular, and neoplastic conditions (Fielding, 1985). In 1991, smoking related deaths accounted for 62% of the overall increase in deaths from 1989 (Health Canada, 1996). In 1996, 21% of all deaths in Canada were due to smoking. Finding ways to assist individuals in smoking cessation can thus have a significant impact on the general health of the population and can reduce health care expenditures relating to complications from smoking.

Early studies focused on physician provided smoking cessation interventions in primary care settings. Since that time, cessation programs have been developed for hospital settings and interventions delivered by other healthcare disciplines, particularly nurses. Subjects of these later research endeavors are most often patients with cardiac conditions. The number of studies of hospital-based interventions is still few relative to the overall amount of smoking cessation research found in the literature. As indicated, the hospital-based cessation studies have been narrow in scope, primarily focusing on cardiac patients, followed by cancer, surgery, and general medicine patients. Hospitalization is

recognized as an excellent opportunity to offer smoking cessation programs, so it is surprising that the number of studies in this setting for non-cardiac subjects are so few (Taylor, Houston Miller, Herman, Smith, Sobel, Fisher, & DeBusk, 1996).

Tobacco smoking is the primary risk factor for the development of chronic obstructive pulmonary disease (COPD; Sherman, 1992) and is associated with other respiratory infections (Almirall, Gonzalez, Balanzo & Bolibar, 1999). Both smoking and COPD are predisposing factors for community acquired pneumonia. Smoking facilitates the binding of *Streptococcus pneumoniae* to pharyngeal cells (Piatt, Gazzola & Allegra, 1997) and through a series of changes in the lung tissue increases the susceptibility of the individual to respiratory viruses (Sherman, 1992). Plouffe, Breiman and Facklam (1996) reported that more than half of all otherwise healthy adults with invasive pneumococcal disease are smokers. A North American case control study conducted by the Active Bacterial Core Surveillance Team (Centers for Disease Control and Prevention) revealed that current smoking quadrupled the odds of invasive infection and over doubled the odds of such disease of nonsmokers exposed to secondhand smoke (Sheffield & Root, 2000). Almirall et al. (1999) found that within his study population of subjects with community acquired pneumonia, 32.4% of cases were attributable to tobacco consumption.

The purpose of this study was to investigate smoking cessation among patients hospitalized with community acquired pneumonia (CAP). To date, no published research has examined this issue, and in Edmonton, there was a unique opportunity to study smoking cessation among patients hospitalized with CAP. The Capital Health Region piloted a critical pathway for managing the treatment of patients diagnosed with CAP. The Pneumonia Pathway ran from November 2000 to November 2002 and aided

emergency room physicians in determining the severity of a patient's pneumonia and if they required hospital admission for treatment. If admitted, the pathway provided a consistent plan of care for the patients through to their discharge. Part of the pathway was the provision of smoking cessation information to pneumonia patients who smoke. This study investigated the combined effectiveness of the information package and selected psychosocial variables on smoking cessation amongst this specific population of smokers.

This research begins with a review of the literature, followed by an explanation of the methods and procedures that were used in the study. The following sections include information about the study sample, instruments, data collection and analysis and study limitations and implications.

Review of the Literature

There is a vast amount of research literature on smoking cessation; however the present review is limited in scope to studies of cessation in the context of health care services. First, the role of primary care in smoking cessation is briefly reviewed. Second, the bulk of the review covers hospital-based smoking cessation programs. Psychosocial variables relating to smoking cessation that are commonly found in the literature are also reviewed.

Smoking Cessation in Primary Care

Several factors influence the effectiveness of smoking cessation strategies in primary care. Patients generally view physicians as credible and trustworthy sources for information and help. Physicians also have contact with a vast majority of the public and therefore have excellent opportunity to encourage smokers to quit. The results of a US

Public Health Service Report (2000) indicate that at least 70% of smokers visit a physician annually and that as little as three minutes of physician intervention can increase cessation rates significantly. Simple advice by a physician to quit is known to yield a 5 – 7% long-term cessation rate (Russell, Wilson, Taylor & Baker, 1979; Stewart & Rosser, 1982). Despite these encouraging findings, a concern arises that physicians do not routinely identify which of their patients are smokers (Humair & Ward, 1998; Dickinson, Wiggers, Leeder & Sanson-Fisher, 1989), and thus miss opportunities to assist them. The issue of follow-up through the physician's office is obviously a problem as well, given the volume of patients they treat.

Hospital-Based Smoking Cessation Interventions

In order to assess the current state of knowledge on smoking cessation in hospital-based programs, a systematic literature review was conducted. The search terms 'smoking cessation + hospitalization' were used for all the following databases, along with the other terms in brackets: Ageline, AMED 1985 to 2001, Best Evidence 1991 to 2001 (smoking cessation), CancerLIT 1936 to 2001, Cinahl 1982 to 2001 (smoking cessation + inpatients; teaching materials + smoking cessation/smoking cessation programs; smoking cessation + program evaluation; smoking cessation + health promotion), Cochrane Database (smoking cessation), Embase 1988 to 2001 (smoking cessation + health promotion), Healthstar 1975 to 2000 (smoking cessation + teaching materials; smoking cessation + program evaluation), Medline 1966 to 2001 (smoking cessation + teaching materials; smoking cessation + hospitalization or inpatients; smoking cessation + tobacco use cessation + program evaluation; smoking cessation + health promotion), Nursing Collection 1995 to 2001, Nursing Collection 2 1996 to 2001,

PsychInfo 1984 to 2001, and PubMed. Health Canada and Statistics Canada websites were also reviewed for possible research articles, as well as reports of the Ontario Tobacco Research Unit.

Inclusion and exclusion criteria for articles generated by these searches were that (1) articles had to present data on smoking cessation programs in hospital settings only, rather than medical clinics or health maintenance organizations; (2) articles had to focus on smoking cessation among adult patients, rather than adolescents, substance abuse and mental health patients, or hospital staff; and (3) articles were excluded if they focused on cost-effectiveness of smoking cessation programs.

A total of twenty studies meeting the inclusion and exclusion criteria were identified in a preliminary review of the abstracts (see Appendix 1).

Studies of specific diagnostic groups. Taylor, Houston Miller, Killen and DeBusk (1990) examined the effects of a nurse-managed intervention for smoking cessation in patients post myocardial infarction. The intervention was initiated in hospital and continued with telephone follow-up. The program utilized one-on-one counseling, manuals and audiotapes. One hundred and thirty patients were followed up one year after enrollment. Smoking cessation rates, verified biochemically, were significantly greater (71%) in the intervention group than in a usual care group (45%). Including patients lost to follow-up (considered smokers) the rates were 61% for the cessation intervention and 32% for usual care.

A second study also evaluated the effect of a nurse-delivered smoking cessation intervention for patients hospitalized with cardiac disease (Johnson, Budz, Mackay & Miller, 1999). Both smoking cessation rates and smoking cessation self-efficacy were

studied. This quasi-experimental design utilized two structured in-hospital contacts followed by 3 months of phone support. Eighty-six patients completed questionnaires at a 6-month follow-up. Only self-report measures of tobacco use were used. The cessation rates, including patients lost to follow-up, were 46% for the intervention group and 31% for the nonequivalent control group. Although encouraging, this difference did not prove to be statistically significant, nor were there any differences across groups in the subjects' self-efficacy for quitting.

Stanislaw and Wewers (1994) evaluated a smoking cessation intervention among hospitalized surgical cancer patients. Three hospital visits by an oncology clinical nurse specialist, along with a cessation booklet and audiotape were provided; and patients received five weekly phone calls after discharge. Seventy-five percent of the intervention subjects were abstinent compared to 42.9% of the usual care subjects; however, this difference was not statistically reliable across groups.

Effectiveness of a nurse-managed minimal smoking cessation intervention for hospitalized cancer patients was studied by Griebel, Wewers and Baker (1998). The 36 subjects in this randomized clinical trial participated in an individual, one time, in-hospital 20-minute discussion with an advanced practice nurse. Smoking abstinence was measured 6 weeks after discharge by self-report and biochemical validation. Cessation rates were not significant with 21% intervention and 14% usual care subjects having abstained from smoking.

Two studies investigated cessation among general surgical patients. The first was a randomized controlled trial that enrolled 324 patients who had undergone noncardiac surgery (Simon, Solkowitz, Carmody & Browner, 1997). Experimental subjects received

a multicomponent intervention (individual counseling, videotape, self-help literature, nicotine replacement therapy and 3 months of phone follow-up) while the control group received self-help literature and a brief counseling session. Biochemical validation and self-report measures were utilized. Follow-up occurred at one year with the self-reported and validated rates respectively: 27% intervention versus 13% control and 15% intervention versus 8% control. These differences in rates from both measures proved to be statistically significant across conditions.

Haddock and Burrows (1997) studied sixty individuals in a surgical pre-admission clinic. The experimental group received a variety of educational interventions and self-assessment questionnaires that related to smoking cessation during the clinic, while a control group received routine information. The study author did not describe what the routine information entailed. Upon admission to hospital, eighty percent of the intervention group stopped or reduced smoking compared to 50% in the control group.

A study by Wewers, Bowen, Stanislaw and Desimone (1994) examined smoking cessation among patients with cardiovascular, oncology and general surgical conditions. This project evaluated the effectiveness of three structured in-hospital smoking cessation sessions followed by five weekly phone calls post discharge. Self-reported smoking cessation and biochemical validation of the 80 subjects were measured five to six weeks after hospitalization. Abstinence rates of the intervention and control group were 37.8% versus 25.6%, respectively, but the difference was not statistically significant.

Both medical and surgical patients were studied in a randomized controlled trial (RCT) conducted by Rigotti, Arnsten, McKool, Wood-Reid, Pasternak, and Singer (1997). Subjects were randomly assigned to receive either usual care or an intervention

which consisted of 15 minutes of bedside counseling, self-help literature, a physician chart prompt to advise patients on smoking cessation, and up to three weekly phone calls after discharge. Cessation rates were measured by self-report at one month after discharge and by self-report and biochemical validation at the six-month follow-up. Of 605 subjects followed at one month, point prevalence abstinence rates were 28.9% for the intervention group and 18.9% for controls ($p=0.003$). At the 6-month follow-up, 542 subjects were seen (35 were deceased). For self-reported cessation, the rates were 17.3% versus 14.0%, intervention versus control group ($p=0.26$). Biochemically validated rates also revealed no significance between the groups (60% versus 48%). Subgroup analysis showed significant long-term cessation rates for smokers with little prior experience in trying to quit (27% of the sample).

Haire-Joshu, Ziff and Houston (1995) identified hospitalized smokers with diabetes, assessed the severity of their condition and determined the patients' willingness to partake in a post discharge cessation program. Of the 314 diabetic patients identified in the hospital, only those with a primary cardiac diagnosis had their smoking status routinely documented. Compared with the diabetic non-smokers, the smokers were significantly younger and reported multiple but fewer comorbidities. Of this group ($n=51$), 91% refused to participate in the cessation program. Of those interested in participating, two were rehospitalized within two weeks of discharge, leaving only three subjects in the program.

Studies of hospitalized patients (all conditions). Several other studies in the literature utilized a cross-section of patients admitted to hospital, rather than studying a specific diagnostic group. One study reviewed developed and evaluated a brief smoking

cessation and relapse-prevention program (Stevens, Glasgow, Hollis, Lichtenstein & Vogt, 1993). Patients (n=1119) received usual care or usual care plus an intervention consisting of a 20-minute bedside counseling session, videotape, self-help materials, and a follow-up phone call. This brief, low-intensity intervention successfully increased the odds of abstinence at a twelve month follow-up by approximately 50%.

Taylor, Houston Miller, Herman, Smith, Sobel, Fisher, and DeBusk (1996) randomized 660 patients who were motivated to quit, into usual care and intervention groups. The intervention involved a meeting with a nurse-case manager, videotape, a workbook, relaxation audiotape, and nicotine replacement therapy (NRT) as well as follow-up phone calls (4 calls within 3 months after discharge). Self-reported smoking rates were obtained at 12, 24 and 52 weeks after discharge along with biochemical validation or corroboration of a family member. At one year, 26% of patients had either died or were lost to follow-up. The confirmed cessation rates at this time showed significant results with 31% for the intervention group and 21% for the usual care group ($p=0.006$). Several of the same researchers conducted another study the following year comparing the efficacy of two smoking cessation programs within four hospitals (Houston Miller, Smith, DeBusk, Sobel, & Taylor, 1997). This RCT evaluated three conditions: usual care, minimal intervention or intensive intervention. The minimal intervention group received nurse-mediated counseling with one phone contact after discharge. The intensive intervention group received the same counseling but with four phone contacts after hospital discharge. Smoking cessation rates (verified biochemically) one year after enrollment into the study were 20% for usual care, 22% for minimal intervention, and 27% for intensive intervention. The only significant difference between

the groups was for usual care versus intensive intervention.

Stevens, Glasgow, Hollis and Mount (2000) argued cessation counseling could be efficacious and cost-effective when delivered by respiratory therapists. Hospitalized patients (n=1173) were randomly assigned to either usual care or an intervention that provided bedside counseling, a videotape, self-help materials and a follow-up telephone call. Subjects were followed-up at 12 months after enrollment. Only self-report was used as an outcome measure for abstinence from smoking for greater than 6 months at the end of one year. At this time, 14.7% of the usual care group compared to 15.2% of the intervention group were nonsmokers. This result was not significant. The researchers reported that the study results were due to failure to reach enough patients with the interventions and reduced effectiveness of the RT's interventions versus experienced and professional cessation counselors.

Studies investigating different types of interventions. Several other studies specifically evaluated the type of cessation intervention used, (e.g. nicotine replacement therapy), rather than hospitalized patient's diagnosis. Rigotti, Arnsten, McKool, Wood-Reid, Singer and Pasternak (1999), prospectively followed 650 subjects admitted onto medical and surgical units of one hospital. Patients were randomly assigned to receive either usual care or brief bedside smoking counseling. Through inpatient pharmacy records the authors found that only 34 of the 650 patients received NRT during their hospitalization. These 34 subjects included only 9.6% of smokers reporting difficulty abstaining while in hospital and 9.0% of smokers experiencing nicotine withdrawal. Patients' use of NRT was independent of their intention to quit and was not correlated with cessation at 1 and 6 months after discharge from hospital.

Other researchers investigated perceived acceptability, safety, and efficacy of a transdermal nicotine system with a minimal behavior intervention (Martin & Robinson, 1995). Eighty patients who smoked were enrolled in this open, noncomparative study. Subjects received 24-hour nicotine patches along with simple support over 5 visits on an outpatient basis. Smoking status was assessed at 26 weeks by self-report and verified by measuring expired air carbon monoxide and blood cotinine levels. At this time, 19 of 80 subjects were nonsmokers and 14 had significantly reduced their consumption of cigarettes. Side effects reported included itch and local erythema, insomnia, and abnormal taste. The authors felt that overall the patch was safe and well tolerated and reported its efficacy to be comparable to results obtained in controlled trials.

Another study assessed the safety and efficacy of brief counseling and the nicotine patch in hospitalized patients and further attempted to identify variables associated with long-term cessation after hospitalization (Lewis, Piasecki, Fiore, Anderson, & Baker, 1998). One hundred and eighty-five subjects were randomly assigned to one of three different interventions: (a) minimal care consisting of a brief physician provided motivational message, (b) a counseling plus nicotine patch intervention that included the physician's message along with NRT and further bedside and telephone counseling, and (c) a counseling plus placebo patch intervention, identical to intervention (b) except the patches did not contain nicotine. Outcome measures were obtained at 6 months by self-report and biochemical validation. Abstinence rates were 4.9%, 9.7% and 6.5% respectively, and did not differ across conditions. The authors found that patients admitted for respiratory disease were more likely to quit than patients with any other diagnosis. The nicotine patch was reportedly well tolerated.

Hospitalization and motivation to quit smoking. Bittoun, McMahon and Bryant

(1991) conducted a survey to examine the extent of overt and covert smoking by 311 patients during their hospitalization. Twenty percent admitted to smoking during this time while the expired air carbon monoxide of another 8% of patients (who denied smoking) indicated recent smoking. The authors found that patients with a cardiovascular or respiratory illness were much more likely to be deceptive about their smoking and that smokers were more than twice as likely to be readmitted for the same condition than the nonsmoking patients.

Another study looked at changes in behavior associated with hospitalization prior to initiation of hospitals' smoke-free policy (Glasgow, Stevens, Vogt, Mullooly & Lichtenstein, 1991). The researchers identified the frequency of various smoking cessation related behaviors that occurred during and following patients' hospitalization. The sample consisted of 526 patients who smoked and were hospitalized for a variety of conditions. Three factors were examined: not smoking while in hospital (51%), attempting to quit after hospital discharge (37%), and abstinence from smoking one year later (16%). Both older patients and those with circulatory or respiratory diagnoses were half as likely to smoke in hospital and twice as likely to attempt quitting. For long-term abstinence, the authors found that heavier smokers were significantly more likely to quit. It was surmised that the hospital setting may be effective for smoking cessation programs, especially for heavier smokers.

Emmons and Goldstein (1992) assessed smoking prevalence and interest in quitting among 304 patients hospitalized on a cardiovascular or general medical unit as well as the role of hospital staff in promoting cessation. The prevalence of smokers in this

population was 16% (20% cardiovascular unit versus 12% general medical unit) with 79% indicating a desire to quit. Quitting on one's own was preferred to using formal treatment options. There was a statistically significant reduction in self-reported smoking rate for both groups as a result of hospitalization. The decrease was greater for the patients on the cardiovascular unit. There was a significant difference in the amount of hospital staff smoking intervention between the groups. Sixty-six percent of cardiovascular patients indicated that the physicians discussed smoking cessation with them compared to only 17% of the general medical unit patients. The figures for the nursing staff were 52% and 16% for the cardiovascular and general medical patients, respectively. The authors suggest these findings indicate that hospital smoking cessation programs for patients should provide self-help oriented support and brief staff-delivered counseling.

Another study that related smoking cessation and hospitalization was conducted by Orleans, Kristeller and Gritz (1993). These authors provided rationale for hospital-based smoking cessation programs and described a minimal-contact treatment model based on an extensive review of other studies (primary care, self-help, and inpatient) and prominent theories of health behavior change. The results of the studies reviewed provided limited evidence that long-term abstinence rates were highest for multicomponent hospital interventions that provided motivational and cessation counseling with longer and more individualized counseling, follow-up, and pharmacological adjuncts. The authors concluded that hospitalization does indeed provide a unique "window of opportunity" as suggested by Emmons and Goldstein (1992). The authors also reviewed various studies based on different patient groups –

cardiovascular and pulmonary disease, cancer and chemical dependency. This article reveals that the most effective elements of the multicomponent treatment have not been identified nor have the processes involved in smoking behavior change for inpatient populations been systematically explored.

Literature review articles. The last two studies within this portion of the literature review are a systematic review and a meta-analytic review. Law and Tang (1995) provide a systematic review of the effectiveness of interventions intended to assist people with smoking cessation. They analyzed data from 188 randomized controlled trials and found the following results. Physicians providing personal advice and encouragement to quit during a single routine visit yields a 2% cessation rate without relapse within the first year. This effect, although modest, is cost-effective. Additional interventions such as follow-up, demonstration of spirometry, etc. have an increased effect, which is variable in extent. They found advice and encouragement were more effective for smokers with higher risks (pregnant women and patients with ischemic heart disease). Behavior modification techniques led by a psychologist, whether in group or individual sessions, had a significant effect. This effect however was no greater than physician advice but was considerably more expensive. Hypnosis had no proven effect and acupuncture was ineffective. NRT was helpful for approximately 13% of smokers seeking help, and even more so for nicotine-dependent people. The authors concluded by stating that all physicians should advise their patients to quit and those patients intending to do so should be given additional support, including NRT.

Given the common use of telephone follow-up interventions after hospital discharge, Lichtenstein, Glasgow, Lando, Ossip-Klein and Boles (1996) conducted a

meta-analytic review of the evidence for phone counseling for smoking cessation. They identified two types of approaches for this intervention: reactive and proactive. Help lines or crisis lines, examples of the reactive approach, attract only a small percentage of smokers. They appear to be effective for large populations as broad public health interventions. This approach is generally difficult to evaluate and there have been very few trials attempting to do so. There is more variety in the different types of proactive interventions. The authors examined 13 randomized trials and found that most revealed significant 3-6 month effects and 4 had substantial long-term results. They reported that proactive phone counseling seemed most effective when used alone or to supplement programs initiated in hospital settings.

Summary. The natural history of smoking cessation during hospitalization (Glasgow et al., 1991) suggests that about half of patients do not smoke during their admission, while about a third attempt to quit post-hospitalization. Adding cessation programs to usual hospital care yields mixed results. Of the twenty hospital based cessation studies reviewed, fourteen compared smoking cessation rates between an intervention group and a usual hospital care group. The vast majority (90%) of the studies used multiple intervention methods, including: one-on-one counseling, manuals/booklets, self-help literature, audiotapes, videotapes, telephone follow-up support, nicotine replacement therapy, and physician advice. Seven of the 14 studies (50%) showed statistically significant differences in smoking cessation between intervention and control groups (Taylor et al., 1990; Stanislaw & Wewers, 1994; Simon et al., 1997; Haddock & Burrows, 1997; Stevens et al., 1993; Taylor et al., 1996; and Houston-Miller et al., 1997). In contrast, five studies did not find significant differences between intervention groups

and controls (Johnson et al., 1999; Griebel et al., 1998; Wewers & Stanislaw, 1994; Stevens et al., 2000; and Lewis et al., 1998). One study showed an impact of a cessation intervention at one month follow-up, but not 6 months later (Rigotti et al., 1997).

Sample size varied considerably across the studies, from 3 subjects to 2024 subjects. The mean number of subjects for the 20 studies was 432 patients. Follow-up periods ranged from 4 weeks to 52 weeks. Out of eighteen studies, five used only self-report of smoking status and two used only biochemical validation. The majority of the studies used both self-report and biochemical validation to determine smoking status. None of the studies examined smoking cessation among patients with community acquired pneumonia (CAP). Thus, there was an important need to investigate cessation in this population.

Psychosocial Context of Smoking Cessation

The research reviewed so far emphasized the impact of hospital based smoking cessation programs. However, many of these studies recognize that psychosocial factors can influence smoking cessation in addition to programs offered by hospital staff. These factors will be used to help form the basis of the research study.

Self-efficacy. The construct of self-efficacy was originally developed by Bandura in 1977 as a cognitive mechanism essential to behavior change (DiClemente, 1981). Self-efficacy refers to how capable a person feels in performing a specific behavior that will lead to a certain outcome (Strecher, DeVellis, Becker, & Rosenstock, 1986). Self-efficacy has proven useful in predicting cessation among self-quitters and among people attending formal cessation programs (Stuart, Borland, & McMurray, 1994). Stuart et al. (1994) also found that pre-treatment self-efficacy scores predicted early abstinence (i.e. within 6

months after treatment). Garcia and Schmitz (1990) cite several studies that predict smoking status up to six months after treatment by using post treatment self-efficacy scores. According to Garcia and Schmitz's (1990) description of Bandura's theory, self-efficacy ratings obtained in closer proximity to the behavior allow for more accurate prediction of subsequent abstinence or relapse.

DiClemente (1981) predicted that smokers who successfully maintain cessation at least five months would show higher self-efficacy ratings than relapsers. His study found that efficacy expectations were highly related to an individual's ability to maintain smoking cessation at the five-month follow-up. DiClemente, Prochaska, and Gibertini (1985) studied self-efficacy and the stages of self-change of smoking and concluded that efficacy expectations were highly related to one's ability to maintain cessation and also to movement through certain stages of change (contemplators and recent quitters). Self-efficacy has also been indicative of whether a lapse in abstinence will lead to complete relapse as smokers with higher self-efficacy can generally regain control better than those with lower efficacy (Garcia & Schmitz, 1990).

Social support. Social support is another psychosocial factor that can strongly influence cessation attempts. An individual's ability to adapt and cope with cessation, both of which are facilitated through social support, influences the initiation and maintenance of behavior change (Murray, Johnston, Dolce, Lee, & O'Hara, 1995). Mermelstein, Cohen, Lichtenstein, Baer, and Kamarck (1986) cite several studies that show that individuals with high levels of social support have fewer psychological and physical symptoms and lower mortality rates compared with those who have lower levels of support. They suggest that one manner in which support may affect physical health is

through changes in the performance of health related behaviors, such as alcohol and cigarette use, diet and exercise.

Mermelstein et al. (1986) studied support directly related to the desired behavior change and general support resources. The measure for general support evaluated the perceived availability of other's support rather than membership in a group or number of social contacts. These researchers also assessed the impact of social support on both smoking cessation and maintenance. In their first study, subjects with perceived high levels of general social support were more successful at quitting than those with perceived lower levels of social support. This difference was found in the second study as well but did not reach statistical significance. In both studies, there was a trend for partner support in relation to quitting to be correlated with reductions in smoking at the end of the treatment intervention. The results of the studies also suggested (although not significantly) that associating with friends who smoke might at times be a hindrance to initial cessation.

Mermelstein et al. also found that perceived availability of general social support significantly differed between abstainers and relapsers at the three-month follow-up. At twelve months post treatment however, the only factor predictive of abstinence was the network variable. Having both other smokers in the household and smokers amongst one's group of friends was a significant hindrance to smoking cessation maintenance. In both groups, there was also a trend towards higher relapse having more smokers amongst one's coworkers. Mermelstein et al. (1986) suggest the results of these studies indicate there is a role for all three types of social support and that they may be influential at different times throughout initial cessation and maintenance.

Murray et al. (1995) also studied social support with respect to quitting smoking and maintenance, types of support, follow-up intervals and gender differences. They found the highest twelve-month abstinence rates for subjects with ex-smoking support persons who also participated in the treatment intervention. Married subjects were more successful at initial quitting time and somewhat more abstinent at twelve months time. Abstinence at the four and twelve month follow-up based on presence of a support person in the treatment program was found to be significant for males only. The presence of other household smokers negatively affected females ability to quit and resulted in lower abstinence rates for all subjects at twelve months. The researchers felt that social support is one of the more important determinants of success for quitting smoking and remaining abstinent.

Stress. Stress is also a psychosocial factor that impacts smoking cessation. Israel and Schurman (1990) purport that stress may interfere with an individual's ability to initiate and maintain behavior change. Manee and Talsma (1995) cite several studies that report that degree of stress and coping style during smoking cessation are theoretically and empirically accepted as critical to successful quitting. Carey, Kalra, Carey, Halperin, and Richards (1993) studied the impact of stress on unaided smoking cessation. They found that quitters smoked less at baseline, were less dependent on nicotine, reported higher levels of self-efficacy and perceived less stress during their efforts to abstain, compared to nonquitters. As well, the researchers revealed that quitters utilized problem solving strategies and cognitive restructuring techniques while nonquitters tended to use more wishful thinking, self-criticism and social withdrawal. As Cohen and Lichtenstein (1990) indicate, the relationship between smoking and stress is bi-directional: stress

makes it difficult to quit and not being able to quit causes stress.

A recent study by Matheny and Weatherman (1998) measured the relative contribution of stress coping resources, smoking history, locus of control and demographic factors to the maintenance of smoking cessation. Several factors differentiated relapsers from quitters: low household income, being separated, divorced or widowed, other smokers in the household and greater percentage of smoking-related health problems. Each of these factors could potentially contribute to an increased perception of stress. Furthermore, the results showed that three subscales of the Coping Resources Inventory for Stress distinguished abstainers from relapsers. Abstainers scored significantly better on the confidence (belief in coping abilities), physical health (perception of overall health and wellness) and physical fitness subscales (personal health practices).

Parrott (1995) reviewed the relationship between smoking and stress based on the findings from a series of four published studies. He found that subjects' feelings of anxiety and stress were significantly lower post-smoking than pre-smoking. Even though mood improved after smoking, it again worsened in between cigarette use. The results suggest that smoking causes the relief of adverse moods due to acute nicotine withdrawal (deprivation reversal model) rather than producing beneficial moods (nicotine resource model). The findings also explain why smokers who achieve abstinence experience reduced levels of daily stress once they no longer have nicotine withdrawal. Parrot states that smoking is likely a direct cause of stress and that smokers also use cigarettes to cope with environmental stressors.

Each of the three psychosocial factors reviewed (self-efficacy, partner support and

daily stresses) were evaluated in a study by Gulliver and Hughes (1995). Measures were taken pre-cessation and again at 7, 14, and 30 days post-cessation in a group of self-quitting subjects. The researchers found that baseline self-efficacy predicted smoking cessation within the first week only and that subsequent efficacy measures predicted relapse at the next follow-up. Results indicated that smoking-specific partner support did not predict cessation in the first week, when 40% of subjects had relapsed, but became a predictor for relapse 8-90 days after cessation. The outcome of the stress measure was not discussed in this paper.

Nicotine dependence. Physical dependence on tobacco is another psychosocial factor found in the smoking cessation literature (Simon et al., 1997; Taylor et al., 1996; Rigotti et al., 1999; Lewis et al., 1998; Wilson et al., 1998; and Johnson et al., 1999). A US Public Health Service report for treating tobacco use and dependence (2000) reveals there are numerous studies conducted in the last 20 years that explain the nature of tobacco dependence as a chronic disease, that nicotine is addictive, and that there are several effective types of treatment. Other research studying aspects relevant to smoking, such as acquisition, maintenance, cessation and relapse are increasingly emphasizing the mediating role of nicotine dependence. Most of the studies noted above assessed subjects' nicotine dependence using the Fagerström Tolerance Questionnaire, or a derivation of it. This tool was developed through research performed by Karl-Olov Fagerström in 1978, which indicated that smokers differ in their degree of physical withdrawal after smoking cessation.

Stage of change. Readiness to stop smoking is a concept described by the Transtheoretical Model of Health Behavior Change. This model proposes that health

behavior change requires progression through six different stages: precontemplation, contemplation, preparation, action, maintenance and termination (Prochaska & Velicer, 1997). In precontemplation, individuals have no intention to take action to change a health behavior within the next six months. People in contemplation however, are intending to make a change within the next six months. When individuals are planning to take action within the immediate future (the next month), they are in the preparation stage. Once they have implemented change in their lifestyles within the last six months, progression has been made to the action stage. Maintenance stage occurs while people attempt to prevent relapse. When zero temptation and 100% self-efficacy have been achieved, the individual has reached the termination stage.

Prochaska and Velicer (1997) also describe other constructs that are part of their model. They explain the ten processes of change that are overt and covert activities individuals use to progress through the stages. Decisional balance is the construct that reflects a persons' weighing of the pros and cons of changing their behavior. Self-efficacy is a situation specific construct derived from Bandura's self-efficacy theory explained earlier. The last construct is temptation, described as the intensity of urges an individual experiences to engage in a certain activity during a difficult situation. Temptation scores tend to decrease linearly as one advances from precontemplation to maintenance, while self-efficacy scores generally increase linearly (Prochaska & Marcus, 1994). The authors of this article also reveal that self-efficacy only predicts progress in the action and maintenance stages.

Patients admitted to a general medicine service were the subjects of a study conducted by Vernon, Crane, Prochazka, Fairclough and MacKenzie (1999). This cross-

sectional study explored the impact of stage of change, self-efficacy to quit and nicotine dependence. Some 154 patients were asked to fill out a questionnaire and were provided with assistance to quit smoking through educational materials, free outpatient classes and nicotine patches. The unadjusted proportion of smokers in this population was 45.7%, significantly higher than the proportion in the general population where this study was conducted (21.8%). Within this group, 57.9% had a moderate to very high nicotine dependence. For the stage of change variable, 44.9% rated themselves in the precontemplation stage (no intention to quit), 8.1% were contemplators (intending to quit within 6 months) and 25.5% were in preparation phase. On the 10-point self-efficacy scale, the median one-week score was 4 and the 6-month score was 5. Vernon et al. suggest that patients' belief in association between smoking and hospitalization was significantly correlated with a higher stage of change, higher nicotine dependence, and greater 1-week self-efficacy for quitting.

In terms of measuring stage of change, some researchers have utilized a different format known as the Contemplation Ladder. This instrument was designed by Biener and Abrams (1991) to assess a smoker's stage in a continuum that ranges from no thoughts of quitting to taking action to change smoking behavior. The authors note that this tool is consistent with Prochaska and DiClemente's Stages of Change model. The ladder was used in studies by Emmons et al. (1992), Stevens et al. (2000) and Vernon et al. (1999).

Rationale for the Study

Given the clear relationship between smoking and an individual's increased susceptibility to community acquired pneumonia (CAP), there was a significant need for studying smoking cessation in this population. However, no published studies had been

found that have examined smoking cessation among hospitalized patients with pneumonia. Being diagnosed with an illness that may be related to one's smoking and having to be hospitalized were variables that may have differentiated this group from other hospitalized smokers.

The first goal of this study was to examine the impact of the psychosocial factors reviewed earlier on tobacco use among hospitalized pneumonia patients. It was hypothesized that post hospitalization reductions in tobacco use would be higher among patients reporting greater quitting self-efficacy (Hypothesis 1), greater social support (Hypothesis 2), lower perceived stress (Hypothesis 3), lower nicotine dependence (Hypothesis 4), greater readiness to stop smoking (Hypothesis 5), and greater perception that hospitalization is due to smoking (Hypothesis 6).

The second goal of the study was to examine patients' perceptions of the influence of the smoking cessation information provided by the hospital. Quantitative and qualitative methods were used to evaluate the patients' impressions of these materials. No hypothesis was related to this goal for the research, as the intention was to provide practical information back to hospital practitioners.

Chapter Two

Methods

Overview and Research Design

This study involved both quantitative and qualitative components. Patients participated in a one group pretest-post test research design in which smoking status and psychosocial factors were assessed at pretest. Smoking status and closed and open-ended responses to the cessation intervention were collected two months following provision of the smoking cessation information. Pneumonia patients meeting inclusion criteria for the study were approached prior to hospital discharge and asked whether they would like to take part in a research project on tobacco use. After the baseline questionnaire was administered and prior to hospital discharge, all patients received an intervention consisting of the provision of smoking cessation literature. Two months following provision of the intervention, patients were contacted again and asked to complete a follow-up assessment consisting of smoking measures and feedback on the usefulness of the intervention.

Participants and Study Location

The Pneumonia Pathway was utilized within the six hospitals in the Capital Health Region (prior to the region changes that occurred in April 2003). These hospitals included the University of Alberta (UAH), Royal Alexandra (RAH), Misericordia, Grey Nuns (GNH), Leduc, and Sturgeon. The pathway defined pneumonia as an acute illness with two or more of the following signs or symptoms – cough, sputum production, pleuritic chest pain, fever, chills, dyspnea and crackles on auscultation. In addition all patients had to have a new opacity on chest radiograph. The pathway was divided into a

three-part process that evaluated a patient's appropriateness for discharge from hospital. The first part examined the patient's physiological stability, the second was a functional assessment, and the third section reviewed any possible in-hospital complications. Medical orders in the pathway dictated the necessary interventions for the multidisciplinary health team to carry out. For those patients identified as smokers, the pathway discharge orders indicated that a smoking cessation information package would be offered.

All patients admitted to hospital under the Pneumonia Pathway were initially considered eligible subjects. Inclusion criteria for the study included the following: (1) patients must have been admitted onto an adult inpatient unit (excluding ICU), (2) patients must have been current smokers, verified by patient report, (3) patients must have had a minimum 48 hour length of stay, and (4) patients must have been able to understand and speak English. Patients were excluded from participation in the study if they had a terminal illness or a Mini Mental Status Exam score of less than 24/30.

Intervention

If admission to hospital was necessitated, patients were placed on the Pneumonia Pathway. A physician evaluated the patient during the admission procedures and smoking status was documented in the history on the patient's chart. The Pneumonia Pathway nurse then became involved and visited the patient within a couple days of admission. The nurse verified the patient's smoking status and provided the smoking cessation information. This consisted of two brochures. One was entitled "Help to Quit Smoking: Programs and Resources". This brochure contained information on both traditional and alternative treatments to assist with cessation and also listed specific programs available

in Edmonton. The second brochure, entitled "There's Never Been a Better Time to Quit Smoking", also described various treatment options, as well as important reasons to quit and what to expect during a cessation attempt.

For patients who showed more interest in attempting to quit, the nurse provided one of two booklets entitled "Taking Control of Smoking". These booklets were designed for people either planning to stop smoking in the next month or those who were not quite ready to quit within the next month. The nurse visited the pneumonia patients regularly and on subsequent visits would answer any questions they had about smoking or quitting.

Sample and Procedure

Pneumonia pathway patients. The Pneumonia Pathway was designed to assist Emergency Room physicians in the decision to admit patients diagnosed with community acquired pneumonia into the hospital. Physicians based admission on the patient's Pneumonia Severity Index Score. The scoring system assigned points to 20 variables in the following categories: patient demographic factors, comorbid illnesses, physical examination findings, and laboratory findings. Patients were stratified into five risk groups according to their score (Fine, Auble & Yealy, 1997) These risk groups indicated risk for mortality with a mortality rate of <1% for groups I, II and III. Patients with a risk class I or II were usually not admitted. Those with a risk class III were admitted based on the physician's clinical judgment. A risk class IV or V predicted mortality rates of 9% and 27% respectively and generally required admission to hospital. For those patients who were admitted to hospital, the pathway also assisted with managing their care through a set of standing orders for oxygen therapy, medications, investigations, and consultations to other healthcare professionals.

A total of 7427 patients were treated under the Pneumonia Pathway between November 2000 and November 2002. There were 802 patients within risk class I; 77 were admitted and of that group 37 patients were smokers. In risk class II, there were 2681 patients. Of these, 581 people were admitted and 235 of this group were smokers. A total of 1250 patients were in risk class III. This class admitted 634 patients of which 169 were smokers. For risk class IV there were 1848 patients; 1362 were admitted and 258 of those admitted smoked. Lastly, risk class V had 846 patients. From this class 740 were admitted and 105 of the admissions were smokers.

Overall, of the 7427 patients in the pathway, 3394 were admitted to hospital and 804 (23.7%) of those people admitted were smokers. This is lower than the 28% smoking rate of all residents of Capital Health Region in 2002 (Capital Health, 2002). When broken down by risk level, the percentage of smokers for those patients admitted was: level I - 48.1%, level II - 40.4%, level III - 26.7%, level IV - 18.9%, level V - 14.2%.

Under the Pneumonia Pathway, admitted patients who smoked were identified by Pneumonia Pathway nurses. Nurses briefly described the study to patients and obtained written consent for the researcher to visit them if they were interested in learning more about the study (see Appendix 2). After written consent was obtained the nurse forwarded the patient's name, birth date, hospital unit and Pathway study number to the researcher via e-mail. The researcher visited the patient as soon as possible and outlined the study in detail. Patients interested in participating were provided with an information sheet describing the study (see Appendix 3) and then signed a consent form (see Appendix 4). After the consent procedure, patients were administered the baseline questionnaire (see

Appendix 5). Simple verbal instructions were provided to fill out the baseline questionnaire. The researcher assisted those patients not feeling well to complete the questionnaire.

Once the baseline questionnaire was completed the researcher provided the patients with two smoking cessation brochures supplied by the hospital. Patients' phone numbers were then obtained. Pneumonia Pathway nurses were notified via e-mail that the patients had received the brochures. All patients were provided the brochures regardless of enrolment in the study, as this was the doctor's order dictated in the pathway. Two months following completion of the baseline questionnaire, the researcher contacted each patient by telephone and administered the follow-up questionnaire (see Appendix 6).

Orthopedic comparison group patients. As enrolment of Pneumonia Pathway patients in the study was significantly less than anticipated, two sources of comparison group patients were eventually added – orthopedic patients and Home Care patients. Extensive time was spent attempting to add a third group of patients from the Emergency Room who were diagnosed with pneumonia but not admitted as inpatients, however enrolment of this group was not feasible. Securing Ethics approval to add these groups to the study took four months, along with numerous written and verbal communications to the ethics board to clarify the researcher's objectives.

The orthopedic comparison group consisted of patients in hospital and who smoked, similar to the pneumonia group. However, the orthopedic group patients did not have pneumonia. Smoking status of these patients was ascertained by information provided by patients on the nursing data base, located on their medical record. The unit

charge nurse briefly described the study to the patients and obtained written consent for the researcher to come and speak with those who were interested (see Appendix 7). The nurse either notified the researcher in person or left the consent form in a file in a secure location on the unit, which the researcher checked regularly.

Patients were then seen by the researcher or an assistant to provide full explanation of the study and to obtain written consent from those patients who wished to participate (see Appendix 9). These patients were also provided with an information sheet (see Appendix 8). After providing consent, patients were administered the baseline questionnaire (see Appendix 10) along with basic verbal instructions on how to complete it. Once finished, the questionnaires were picked up and patients were provided with the two smoking cessation brochures. Telephone numbers were obtained and patients were called two months later to complete the follow-up questionnaire (see Appendix 11).

Home Care comparison group patients. This group consisted of Home Care patients who had pneumonia and were smokers, but were not hospitalized at the point of enrolment into the study. The researcher and Home Care Nursing Professional Practice Leader created a memo for Home Care Case Managers outlining the study and requesting their assistance in enrolling patients (see Appendix 12). Packages were left at each Home Care office containing an information sheet, consent form, baseline questionnaire (see Appendices 8, 13, and 14), the two smoking cessation brochures and a self-addressed and stamped envelope to return the questionnaire to the researcher.

The Case Managers identified patients on their caseload who had pneumonia, were smokers and fit the inclusion/exclusion criteria. They explained the study to the patients and provided the information sheet and obtained written consent from those

interested in participating. The Case Managers left the two brochures with the patients and asked that they return the completed questionnaire to the researcher in the envelope provided.

Patient's telephone numbers were obtained on the consent form which the Case Managers mailed back to the researcher. Patients were phoned two months after the questionnaire was received in the mail to complete the follow-up questionnaire (see Appendix 15).

Data collection lasted eleven months for the Pneumonia Pathway subjects and four months for the comparison groups. Only one baseline questionnaire was received from the Home Care group, so this subject was placed in the orthopedic group to form one comparison group.

Baseline Measures

Demographics. The pretest questionnaire included measures assessing gender, age, marital status, education level, and household income.

Smoking history and current tobacco use. This section assessed the number of cigarettes smoked per day, years smoked, previous quit attempts, whether self-quitting or formal treatment was used and longest previous period of abstinence. The following tools were used to measure the psychosocial variables at baseline.

Smoking Self-Efficacy Questionnaire (SEQ-12). This questionnaire was designed by Etter, Bergman, Manfred, Humair, and Pernegeri (2000) to measure current and former smokers' confidence in their ability to abstain from smoking in high-risk situations. The tool was a twelve-item scale consisting of two six-item subscales that measured confidence related to internal and external stimuli. For internal and external

stimuli, internal consistency coefficients were 0.95 and 0.94 respectively and test-retest intraclass correlation coefficients were 0.95 and 0.93 respectively. The authors thoroughly discussed the psychometric properties and concluded that the SEQ-12 fulfilled criteria for content, construct and predictive validity, had high test-retest reliability, sound factorial structure, and high internal consistency and was not biased by social desirability.

Social Support. Three measures of patients' perceived social support were assessed using 5-point scales. The first question asked how much support the patient would receive from their partner, doctor, and best friend if they were to attempt to quit. Responses ranged from 1 (no support) to 5 (lots of support). The second question asked how much pressure the patient has felt from their partner, doctor and best friend to quit smoking. Responses ranged from 1 (no pressure) to 5 (lots of pressure). The last question asked how important their partner, doctor and best friend are in deciding to quit smoking or reduce their smoking. Responses ranged from 1 (not important) to 5 (very important). These items have been previously used in a study of the effects of gender in social control of smoking (Westmaas et al., 2001).

Perceived Stress Scale (PSS). Developed by Cohen, Kamarck and Mermelstein (1983), this scale was a 14 item global measure of an individual's perceived stress within the past month. This instrument measured the degree to which life is judged as unpredictable, uncontrollable, and overloading, three components recognized as being central to the stress experience. The authors reported the scale can be administered in a few minutes and is easy to score. Because perceived stress is influenced by dynamic and different factors, the predictive validity of the PSS diminishes quickly after four to eight

weeks. Coefficient alpha reliability ranged from 0.84 to 0.86 and the test-retest correlation was 0.85. Both concurrent and predictive validity were discussed in depth.

Fagerström Test for Nicotine Dependence (FTND). This tool measured an individual's physical dependence to nicotine (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). This tool, originally developed by Fagerström in 1978 had since been revised to refine its structure, reliability and item selection (Heatherton et al., 1991). The instrument contained six items and was easy to score. Reliability was improved from a coefficient alpha of 0.48 for the original instrument to 0.61 for the revised version.

Readiness to quit smoking. The contemplation ladder, designed by Biener and Abrams (1991), measured readiness to consider smoking cessation using a continuum. The format was depicted by a ladder with ten rungs that range from no thoughts of quitting to engaging in action to change smoking behavior. The tool was consistent with Prochaska and DiClemente's Stage of Change Model. Three indicators of validity were tested: "known groups" validity, concurrent validity, and predictive validity. Significance was found in the difference in ladder scores and correlation with likelihood of making a quit attempt within the next six months. Scores were also significantly positively correlated with number of previous quit attempts and perceived co-worker support. Ladder scores were not, however, predictive of abstinence.

Perception that hospitalization is related to smoking. Patients' perception that hospitalization is related to their smoking was assessed with four questions. The first two questions asked about how likely the patient is to acquire a smoking related illness in the future, and compared to others of their age. Responses ranged from 1 (definitely won't happen) to 5 (definitely will happen). The third question, "In your opinion, is your

smoking related to the reason you were admitted to the hospital?", was taken from research on smokers hospitalized in an urban, public hospital that studied addiction, stages of change, and self-efficacy (Vernon et al., 1999). The last was an open-ended question, "What are your thoughts about smoking and pneumonia?".

Follow-up Measures

Smoking status. Patients were asked about their current smoking status and attempts to quit smoking since hospital discharge, similar to the baseline questionnaire.

Usefulness of smoking cessation information package. Patients were asked closed and open-ended questions to assess how helpful they perceived the information package to be and to determine if other interventions would be perceived as potentially beneficial.

Chapter Three

Analysis and Results

Subjects and Equivalence of Study Groups

Forty-seven subjects were recruited into the study at baseline (24 in the pneumonia pathway group and 23 in the comparison group). The average length of hospital stay for the pneumonia pathway patients was 10.32 days (median 6.09 days, range 166.98 days). Comparison group patients stayed in hospital an average of 5.9 days (median 7.5 days, range 30 days). All comparison group patients underwent a surgical procedure during their hospital stay. There were similar numbers of males and females within and between the two groups. The mean age of the sample was 50.36 years, ranging from 22 to 76. There was no significant difference in gender or age between the two groups.

Marital status and education level varied widely within the groups; however, there was no significant differences across study groups for these variables. Similarly, there was not a significant difference between the pneumonia and comparison group for the variable of household income. Table 2 outlines the descriptive statistics of the baseline characteristics for the two groups.

Table 2

Baseline Characteristics of Study Groups

	Pneumonia Group (n=24)	Comparison Group (n=23)
Sex		
Male	13 (54.2%)	11 (47.8%)
Female	11 (45.8%)	12 (52.2%)

	Pneumonia Group (n=24)	Comparison Group (n=23)
Age (M, SD)	51.8 (13.5)	48.9 (14.5)
Income		
Below \$10 000	4 (16.7%)	2 (11.1%)
Between \$11 000 and \$20 000	7 (29.2%)	3 (16.7%)
Between \$21 000 and \$40 000	3 (12.5%)	5 (27.8%)
Between \$41 000 and \$75 000	7 (29.2%)	5 (27.8%)
Over \$75 000	1 (4.2%)	3 (16.7%)
Education		
Elementary school	2 (8.3%)	0 (0.0%)
Some high school	6 (25.0%)	7 (30.4%)
High school graduate	7 (29.2%)	7 (30.4%)
Some university	6 (25.0%)	4 (17.4%)
University graduate	2 (8.3%)	3 (13.0%)
Postgraduate	0 (0.0%)	2 (8.7%)
Marital Status		
Single	6 (25.0%)	6 (26.1%)
Married	8 (33.0%)	9 (39.1%)
Separated	3 (12.5%)	1 (4.3%)
Divorced	5 (20.8%)	5 (21.7%)
Widowed	2 (8.3%)	2 (8.7%)

Smoking characteristics. Prior to hospitalization, pneumonia group subjects smoked an average of 22.04 cigarettes per day versus 17.52 cigarettes per day for the comparison group. On the day of enrolment into the study, pneumonia group subjects smoked an average of .88 cigarettes while the comparison group smoked an average of 2.14 cigarettes. Both groups were similar in age when they first smoked. There were no significant differences between groups for any of the baseline smoking variables.

Variables assessing participants' quitting history also did not differ across groups. The majority of subjects in both groups tried quitting on their own rather than using a specific treatment or type of program. For those that sought help, the nicotine patch was the most common form of treatment used.

Nicotine dependence was measured by the Fagerström Test for Nicotine

Dependence, with higher scores on a scale from 0 to 10 indicating increased dependence.

The mean score for the pneumonia group was 5.75 and for the comparison group was

4.26. A t-test indicated that the pneumonia group was significantly more nicotine

dependent than the comparison group, $t(45) = 2.021$, ($p < .05$).

When asked if hospital admission was related to their smoking, 50% of the pneumonia patients felt they were related, whereas none of the comparison patients felt this to be true. A χ^2 test for this variable showed the pneumonia group felt significantly stronger that hospital admission was related to smoking than the comparison group, $\chi^2(1) = 14.882$, ($p < .001$). Table 3 reveals the descriptive statistics of the subjects' baseline smoking characteristics.

Table 3

Baseline Smoking Characteristics

	Pneumonia Group	Comparison Group
Number of cigarettes smoked/day pre-hospitalization (M, SD)	22.0 (8.7)	17.5 (10.1)
Number of cigarettes smoked day of study enrolment	0.9 (2.4)	2.1 (3.7)
Number of cigarettes smoked per day in last 30 days		
1-2	1 (4.2%)	3 (13.0%)
3-5	0	2 (8.7%)
6-10	1 (4.2%)	5 (21.7%)
11-19	7 (29.2%)	5 (21.7%)
20-25	12 (50.0%)	5 (21.7%)
More than 25	3 (12.5%)	3 (13.0%)
Age when smoked first cigarette	14.5 (3.9)	16.1 (5.8)

	Pneumonia Group	Comparison Group
Number of times tried to quit in past	4.1 (6.5)	2.5 (2.5)
Tried to quit on own		
Yes	16 (66.7%)	18 (78.3%)
No	8 (33.3%)	5 (21.7%)
Treatment or programs tried		
Nicotine patch	4 (16.7%)	2 (8.6%)
Nicorette gum	1 (4.2%)	1 (4.3%)
Zyban	0	2 (8.7%)
Wellbutrin	1 (4.2%)	0
More than one treatment	4 (16.7%)	1 (4.3%)
Greatest length of time quit (days)	205.5 (473.9)	171.3 (530.0)
Nicotine dependence score *	5.8 (2.0)	4.3 (3.0)
Perception that smoking is related to hospital admission *		
Yes	12 (50.0%)	
No	12 (50.0%)	22 (100.0%)

Note. * $p < .05$

Psychosocial factors. The results of the psychosocial data analysis revealed the two groups showed a significant difference on three variables: (1) perceived importance of partner in deciding to quit, (2) perceived importance of best friend in deciding to quit and (3) perceived likelihood of having a future smoking-related illness. None of the other variables showed a significant difference between the groups.

Support to quit, pressure to quit and importance of person when deciding to quit or reduce with respect to partner, doctor and best friend were all measured on a five point scale ranging from 1=no support/no pressure/not important to 5=lots of support/lots of pressure/very important. T-tests indicated that partner and best friend were significantly more important to the pneumonia group than the comparison group when deciding to quit

or reduce, $t(29) = 3.383$ ($p < .01$) for partner and $t(44) = 2.389$ ($p < .05$) for best friend.

Self-efficacy to refrain from smoking was measured using the SEQ-12, a twelve item questionnaire using a 5 point scale. The scale indicators were 1=not at all sure, 2=not very sure, 3=more or less sure, 4=fairly sure, and 5=absolutely sure. Stress was measured using the 14 item Perceived Stress Scale. The instrument used a 5 point scale where 1=never, 2=almost never, 3=sometimes, 4=fairly often, and 5=very often. Readiness to quit smoking was measured on a 10 point scale, with indicators of 0=no thought of quitting, 2=think I need to consider quitting someday, 5=think I should quit but not quite ready, 8=starting to think about how to change my smoking patterns, and 10=taking action to quit. As previously indicated, these variables did not reveal a significant difference between the two groups.

The questions of likeliness of having a future smoking related illness and when compared to others the same age were both measured with a five point scale, ranging from 1=definitely won't happen to 5=definitely will happen. Results of a t-test indicated that the pneumonia group felt more likely to have a smoking related illness sometime in the future than the comparison group, $t(44) = 2.025$, ($p < .05$). When patients compared themselves to their cohorts on the likeliness of a future smoking related illness however, there was not a significant difference between the groups. Table 4 presents descriptive statistics of psychosocial factors that relate to smoking.

Table 4

Psychosocial Factors Related to Smoking

	Pneumonia Group M (SD)	Comparison Group M (SD)
Support from partner to quit	3.9 (1.7)	3.8 (1.5)
Support from doctor to quit	4.0 (1.4)	4.5 (1.0)
Support from best friend to quit	4.0 (1.3)	3.9 (1.2)
Pressure from partner to quit	2.8 (1.9)	2.2 (1.5)
Pressure from doctor to quit	3.2 (1.5)	3.0 (1.7)
Pressure from best friend to quit	3.0 (1.7)	2.5 (1.6)
Importance of partner when quitting *	4.8 (.4)	3.1 (1.8)
Importance of doctor when quitting	3.1 (1.5)	3.0 (1.7)
Importance of best friend when quitting *	3.5 (1.6)	2.4 (1.5)
Self-efficacy to refrain from smoking score	2.6 (1.0)	2.7 (1.3)
Perceived stress score	26.4 (6.5)	25.0 (7.8)
Readiness to quit score	8.6 (2.9)	7.3 (3.1)
Likelihood of future smoking related illness *	3.4 (1.0)	2.9 (.6)
Likelihood of future smoking related illness compared to others same age	3.4 (1.1)	3.1 (.8)

Note. * $p < .05$

Summary of Baseline Results

Baseline results revealed that the pneumonia group and comparison group were significantly different on 5 of the 28 variables measured. Thus, the pneumonia group exhibited greater nicotine dependence, felt more strongly that their partners and best

friends were important when deciding to quit or reduce, perceived that they had a greater likelihood of getting a future smoking related illness, and felt more strongly that their hospital admission was related to their smoking.

Follow-up Data

When compared at follow-up two months later, the two groups showed no differences based on several variables. These variables included number of cigarettes smoked on the day of follow-up as well as over the last two months; the number of quit attempts since baseline; if patients tried to quit on their own or if they tried treatments and/or programs; and the greatest length of time they had quit for since hospitalization. Table 5 presents descriptive statistics of the follow-up smoking characteristics.

Table 5

Follow-up Smoking Characteristics

	Pneumonia Group (n= 19)	Comparison Group (n= 20)
Number of cigarettes smoked on day of follow-up (M, SD)	5.3 (4.7)	5.8 (7.3)
Number of cigarettes smoked per day in the last 2 months		
No cigarettes	4 (21.1%)	5 (25.0%)
1-2	1 (5.3%)	2 (10.0%)
3-5	3 (15.8%)	3 (15.0%)
6-10	2 (10.5%)	2 (10.0%)
11-19	6 (31.6%)	3 (15.0%)
20-25	2 (10.5%)	3 (15.0%)
More than 25	1 (5.3%)	2 (10.0%)
Number of quit attempts in the last 2 months	4.1 (13.6)	1.1 (2.2)

	Pneumonia Group (n= 19)	Comparison Group (n= 20)
Tried to quit on own		
Yes	12 (63.2%)	10 (50.0%)
No	7 (36.8%)	10 (50.0%)
Tried treatment or program		
Yes	4 (21.1%)	3 (15.0%)
No	15 (78.9%)	17 (85.0%)
Greatest length of time quit for in the last 2 months (days)	16.5 (23.8)	21.0 (27.6)

Main Analyses: Longitudinal Predictors of Tobacco Use

Outcome measures and approach. For each participant in the study who provided complete (i.e. baseline and follow up) data, two outcome measures were calculated. A first measure was calculated by subtracting daily smoking level at follow up from daily smoking level before entering hospital. The second measure was calculated by subtracting the average smoking level in the last 2 months (at follow-up) from the average smoking level in the 30 days prior to enrolment. These calculations yielded two measures assessing magnitude of reduction in participants' smoking, and have been used in previous community studies of smoking cessation (Westmaas, Wild, & Ferrence, 2001). Smoking level was used as the outcome measure rather than point prevalence abstinence rates because any effects of psychosocial variables were more easily detected using normally distributed dependent variables, compared to dichotomous dependent variables (Cohen & Cohen, 1983).

The study hypotheses were tested using a setwise hierarchical multiple regression analysis – analysis of partial variance (Cohen and Cohen, 1983, pp. 402-423). In APV, a

set of covariates is initially entered into the regression equation. In a second step, sets of independent variables are entered into the equation. Demographic covariates were added to the model, followed by main effects of the psychosocial factors.

Two dependent measures were analyzed in separate regression analyses: (1) amount of cigarettes smoked on average per day at two month follow-up period and (2) number of cigarettes smoked on the day of follow-up. Baseline scores for each outcome variable were entered in the first step of each analysis, thus producing residualized change scores (i.e. change in smoking level from baseline to follow-up, adjusted for subjects' baseline smoking level). Demographic variables (age, gender and household income) were entered in the second step. The following psychosocial variables were entered in the third step: nicotine dependence; smoking self-efficacy; perceived stress; readiness to quit; social support from partner, doctor and best friend; and perception that hospitalization was related to smoking. Study group (i.e. pneumonia or comparison group) was also added in the third step.

Predicting changes in average daily smoking. Four variables were significantly predictive of change in smoking level during the two months between study enrolment and follow-up: (1) average number of cigarettes smoked in the month before enrolment, (2) amount of perceived stress experienced in the last 30 days, (3) perceived support from the respondent's doctor to quit, and (4) which study group the patient belonged to (see Table 6).

Table 6

Predictors of Change in Average Two Month Post-Hospitalization Smoking Levels

Set	Predictors entered	ΔR^2	ΔF	t	df
1	Covariate Number smoked per day over last 30 days	.221	5.378*	2.319*	1, 19
2	Demographic covariates Age Gender Household Income	.280	.443	-.892 -.827 -.373	3, 16
3	Psychosocial factors Fagerström dependency score Self-efficacy score Perceived stress score Readiness to quit smoking Support from partner Support from doctor Support from best friend Smoking related to hospital admission Study group	.891	4.372*	1.462 .286 -2.524* -1.146 1.460 -3.052* .604 -1.171 2.317*	9, 7

† .05-.10

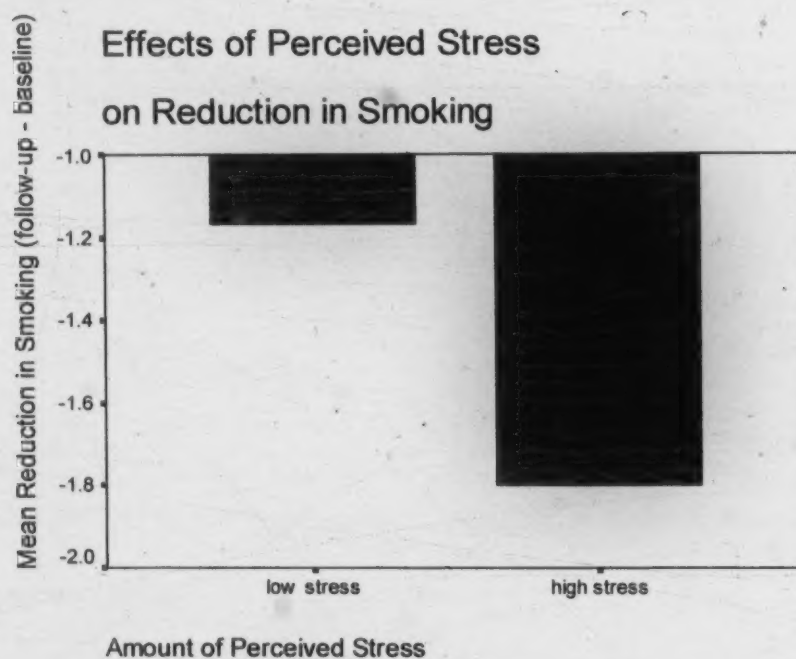
* <.05

Figures 1, 2 and 3 illustrate the effects of perceived stress, support from doctor when quitting, and study group on self-reported reductions in smoking between follow-up and baseline. Subjects were split into high and low groups based on the median scores for the perceived stress scale and the support from doctor to quit scale. In Figure 1, patients with a higher level of perceived stress had a greater reduction in smoking than those patients with less perceived stress. Within the low stress group, 16.7% of patients increased their amount of smoking between baseline and follow-up, 22.2% of patients

remained the same, and 61.1% of patients reduced the amount they smoked.

Correspondingly, in the high stress group, 5.3% increased, 21.1% did not change, and 73.7% of patients reduced the amount they smoked.

Figure 1. Effects of perceived stress on smoking reduction between follow-up and baseline

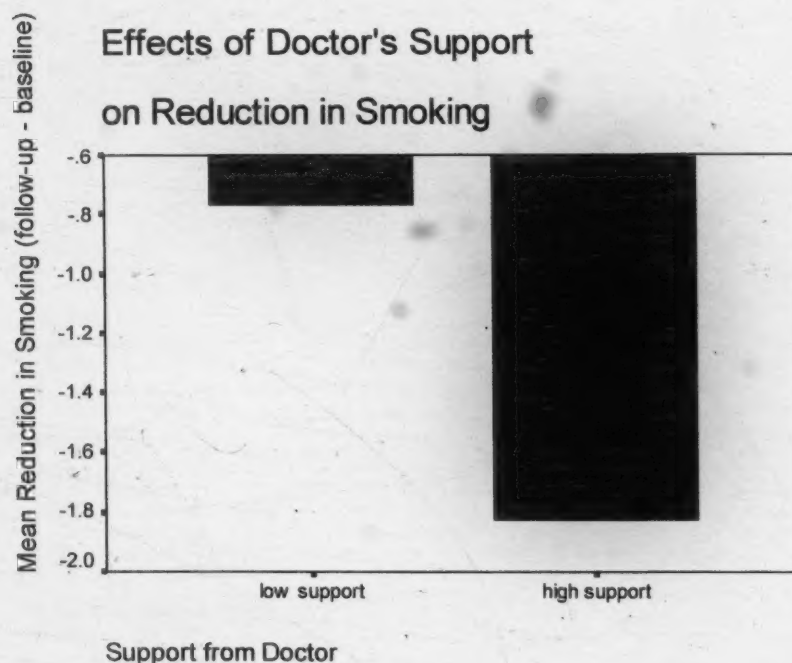


Note. Reduction in smoking score use the following scale: 1 = 1-2 cigarettes, 2 = 3-5 cigarettes, 3 = 6-10 cigarettes, 4 = 11-19 cigarettes, 5 = 20-25 cigarettes and 6 = more than 25 cigarettes

Patients with more support from their doctor had a greater reduction in smoking than those patients with less support (see Figure 2). Between baseline and follow-up, 15.4% of patients in the low support group increased the amount they smoked. Also within the low support group, 23.1% of patient's smoking did not change, while 61.5% of

patients reduced. In the high support group, 9.1% of patients smoked more in the period from baseline to follow-up, 22.7% had no change, and 68.2% reduced the amount they smoked.

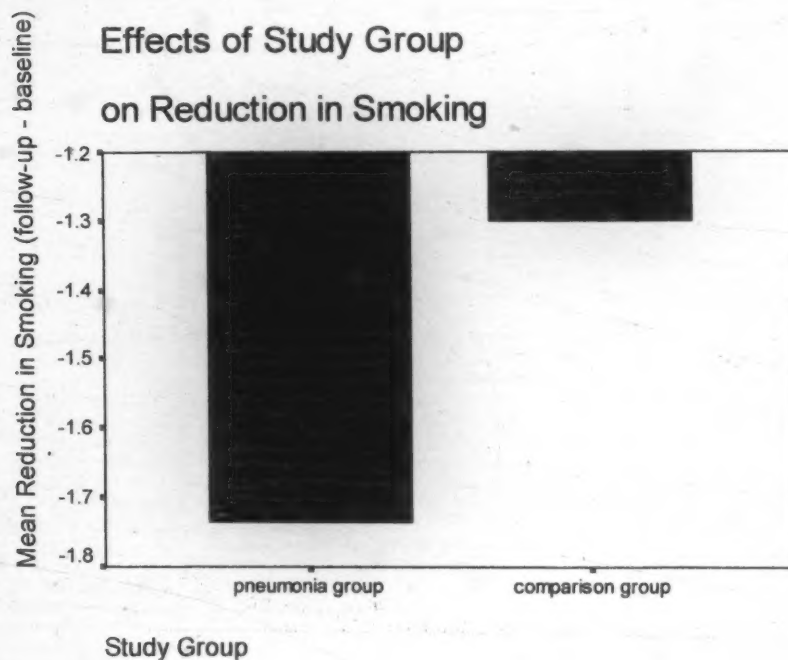
Figure 2. Effects of doctor support for quitting on smoking reduction between follow-up and baseline



Note. Reduction in smoking score use the following scale: 1 = 1-2 cigarettes, 2 = 3-5 cigarettes, 3 = 6-10 cigarettes, 4 = 11-19 cigarettes, 5 = 20-25 cigarettes and 6 = more than 25 cigarettes

Figure 3 reveals that patients who belonged to the pneumonia group had a greater reduction in smoking between baseline and follow-up than those patients in the comparison group.

Figure 3. Effects of study group on smoking reduction between follow-up and baseline



Note. Reduction in smoking score use the following scale: 1 = 1-2 cigarettes, 2 = 3-5 cigarettes, 3 = 6-10 cigarettes, 4 = 11-19 cigarettes, 5 = 20-25 cigarettes and 6 = more than 25 cigarettes

Predicting changes in smoking on day of follow-up. When the amount of cigarettes smoked on the day of follow-up was used as the dependent variable, the number of cigarettes smoked on a typical day pre-admission and patient gender showed a significant predictive ability (see Table 7). Psychosocial variables and study group did not predict change in the amount patients smoked on the day of follow-up.

Table 7

Predictors of Changes in Daily Post-Hospitalization Smoking Levels

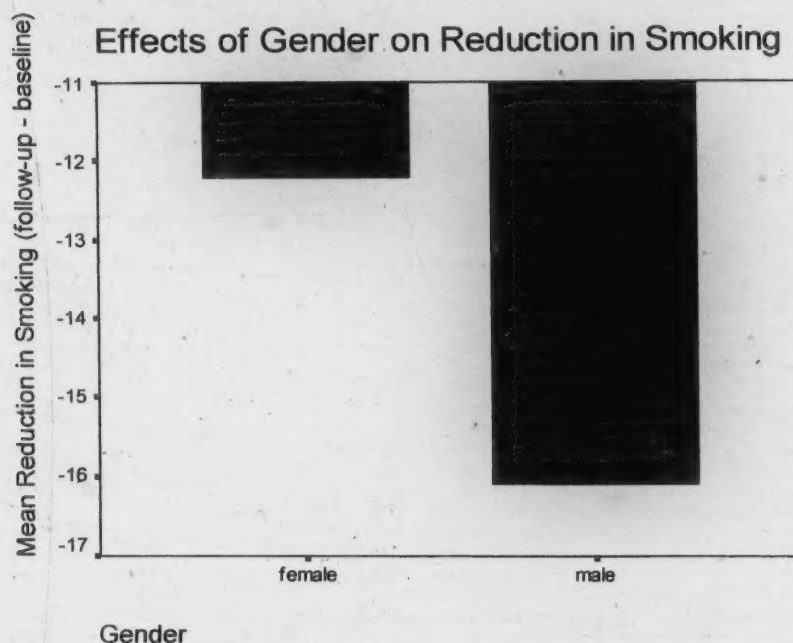
Set	Predictors entered	ΔR^2	ΔF	t	df
1	Covariate Number smoked on a typical day pre- admission	.263	6.427*	2.535*	1, 18
2	Demographic covariates Age Gender Household Income	.498	2.332	-.714 -2.392* 1.165	
3	Psychosocial factors Fagerström dependency score Self-efficacy score Perceived stress score Readiness to quit smoking Support from partner Support from doctor Support from best friend Smoking related to hospital admission Study group	.789	.924	.815 .317 -.747 -.478 -.250 -1.050 -.215 -.173 .951	9, 6

† .05-.10

* <.05

Figure 4 illustrates that male gender was predictive of greater reduction in smoking as compared to the female subjects.

Figure 4. Effects of gender on smoking reduction between follow-up and baseline



Note. Reduction in smoking score equals actual number of cigarettes smoked

Secondary Analysis

Patients' understanding of the relationship between smoking and pneumonia. In the pneumonia group baseline questionnaire, patients were asked "what are your thoughts about smoking and pneumonia?". Twenty-two out of 24 patients responded. The written answers were brief and fell into 7 categories. Four patients recognized that smoking is bad for them (18.2%) and 5 patients commented that getting pneumonia is not good (22.7%). Six patients did not realize there was a medical connection between smoking and acquiring pneumonia (27.3%), however 7 patients felt that catching pneumonia was related to the fact they smoked (31.8%). One patient denied that he even had pneumonia (4.5%) while 2 weren't sure how they caught it (9.1%). Only one patient indicated that

admission to hospital for pneumonia was incentive to quit smoking (4.5%).

Smoking cessation brochures. In the follow-up questionnaire, both groups were asked to comment on the two smoking cessation brochures they were given after completion of the baseline questionnaire. Twenty-five patients confirmed that they read the brochures (64.1%). On a scale of 1 (strongly agree) to 5 (strongly disagree) of how helpful they felt the brochures were, 21 patients responded with a mean of 2.29 (SD .717). Twenty-three patients responded to the question "what was helpful about the smoking cessation brochures?" (60.0%). Many patients felt that there was nothing particularly helpful about the information they were given (47.8%). Three patients couldn't recall the brochures well enough to comment about them (13.0%). Five patients felt the brochures provided helpful information about options for quitting and/or information that was new to them (21.7%). Three patients reported that the brochures clearly outlined the detriments of smoking (13.0%).

Seventeen patients responded to the question "what was unhelpful about the smoking cessation brochures?" (43.6%). Generally, the patients did not feel there was anything to dislike about the brochures (88.2%). Two patients did comment that the brochures did not contain any new information (11.8%).

When asked if they received any other literature about smoking cessation in the hospital, 36 patients responded no and 1 responded yes. Ten patients did not respond to this question. The one patient who did receive further information did not find it to be particularly helpful or unhelpful.

Patients' preferences for smoking cessation support. The pneumonia group patients were asked if they felt the questions they had about pneumonia and/or quitting

smoking were adequately answered in hospital and similarly comparison group patients were asked if their questions about smoking and/or quitting were adequately answered in hospital. Thirty-six patients replied to this question (76.6%). On a scale ranging from 1 (strongly agree) to 5 (strongly disagree) the mean was 1.97 (SD .654).

Using the same scale of responses from 1 to 5, patients were then asked how helpful they felt six alternative types of support would be if they were considering quitting while in hospital. Thirty-seven patients responded (78.7%). The mean and standard deviation (M, SD) for the variables resulted as: doctor's advice (2.49, 1.283), bedside counselling from a smoking cessation expert (2.76, 1.256), nicotine replacement therapy (2.95, 1.153), self-help manuals (3.16, 1.118), videotapes (3.14, 1.134), and post-hospitalization telephone support calls (2.86, 1.159).

The final open-ended question in the follow-up questionnaire asked patients "what other help or information could have been given to you in the hospital with regards to smoking?". Twenty-five of the 36 responses indicated that nothing further could have been provided in hospital (69.4%). Five patients felt that quitting is up to the individual to do and that no external support is going to be able to help them (13.9%). One patient felt that in-hospital treatment should have been offered, specifically the patch (2.8%). Two patients thought that education about the detriments of smoking should be given with one person specifically wanting graphic videos (5.6%). Another two patients reported that providing information about the relationship between smoking and pneumonia would be beneficial (5.6%). One of these patients preferred doctor's information and the other suggested written information.

Three patients discussed the need for some type of incentive to help them quit,

such as a better understanding of the susceptibility to pneumonia due to smoking, having something to relate to such as the Barb Tarbox TV ads and having an increased chance of surgical success by quitting (8.3%). One patient felt that different information should be provided in the pamphlets (2.8%) and another patient indicated that all patients in hospital wanting to quit should be provided with the smoking cessation brochures (2.8%).

Chapter Four

Discussion

Review of Findings

Pneumonia patients versus comparison group. Enrolment of patients with community acquired pneumonia into the study was significantly less than anticipated. Therefore recruitment of a comparison group was initiated to increase the sample size. Comparison group subjects were similar to the pneumonia group in that they were hospitalized and were smokers, but they did not have a lung-related condition.

Twenty-four (24) subjects were recruited into the pneumonia group and 23 subjects were recruited into the comparison group. Subjects were compared at baseline on demographic factors, smoking characteristics, and psychosocial factors known to relate to smoking and smoking cessation. At two-month follow-up, smoking characteristics were again measured, along with subjects' perceptions of smoking cessation literature provided to them while in hospital.

Smoking levels at follow-up compared to smoking levels at baseline revealed the magnitude of reduction in subjects' smoking. Hierarchical multiple regression analysis showed that study group had a significant effect on reduction in smoking. Pneumonia subjects had a greater reduction in smoking than the comparison group between baseline and follow-up.

This is the first study to suggest that patients hospitalized with community acquired pneumonia may exhibit greater reduction in smoking compared to other patients hospitalized for a non-lung related condition. Only two accounts in a review of the literature suggested a similar outcome. Lewis et al. (1998) reported that patients admitted

to hospital for a respiratory disease were more likely to quit than patients with any other diagnosis. Glasgow et al. (1991) indicated that patients with a respiratory diagnosis were half as likely to smoke in hospital and twice as likely to attempt quitting – findings similar to the pneumonia and comparison groups. An interesting finding in this study was that as pneumonia risk class increased from levels I to V, the percentage of smokers decreased, from 48.1% in level I to 14.2% in level V. The psychosocial variables measured revealed significant differences between the two groups that might help explain this difference in smoking reduction.

Psychosocial profile of study groups. A total of 28 demographic, smoking history and psychosocial variables were measured. Neither demographic nor smoking history variables revealed a significant difference between the two groups. However, 5 psychosocial variables did demonstrate significant differences between the pneumonia subjects and the comparison subjects. The pneumonia group exhibited greater nicotine dependence, felt more strongly that their partners and best friends were important when deciding to quit or reduce, perceived that they had a greater likelihood of acquiring a future smoking related illness, and felt more strongly that their hospital admission was related to their smoking. Given that the pneumonia group had a greater reduction in smoking along with these psychosocial outcomes, these findings are consistent with those described in the literature.

Nicotine dependence has been shown to have an intervening role in the acquisition, maintenance, cessation and relapse of smoking (US Public Health Service Report, 2000). With respect to social support, Murray et al. (1995) suggested that it facilitates the ability to adapt and cope with cessation, thereby influencing the initiation

and maintenance of behavior change. A study by Mermelstein et al. (1986) found that subjects with high levels of perceived social support were more successful at quitting than those with lower levels of perceived social support. They found that partner support was correlated to reduction in smoking at the end of the treatment intervention.

Psychosocial Predictors of Change in Smoking

It was hypothesized that reduction in smoking at follow-up would be higher among subjects reporting greater quitting self-efficacy, greater social support, lower perceived stress, lower nicotine dependence, greater readiness to quit, and greater perception that hospitalization is due to smoking. This study however, did not substantiate all these hypotheses. Beyond the effect of study group on smoking reduction, hierarchical multiple regression analysis also revealed that subjects' perceived stress and perceived support from doctor when deciding to reduce or quit were psychosocial factors predictive of reduction in smoking.

Subjects with a higher perception of generalized stress over the last 30 days prior to enrolment had a significantly greater reduction in smoking than those patients with lower levels of perceived stress. This finding is contrary to the literature examining stress and smoking cessation. Israel and Schurman (1990) reported that stress may interfere with a person's ability to initiate and maintain behavior change. Carey et al. (1993) found that quitters in their study were less nicotine dependent, had higher levels of self-efficacy and perceived less stress during cessation attempts as compared to the nonquitters. Cohen and Lichtenstein (1990) stated that the relationship between smoking and stress is bidirectional: stress increases difficulty of abstaining and not being able to abstain creates stress. Lastly, Parrot (1995) indicates that smokers use cigarettes to cope with

environmental stressors.

Patients in this study may have focused on their poor health and resulting hospitalization when completing the stress component of the baseline questionnaire. Most pneumonia group patients were very ill when seen by the researcher; often on oxygen in order to breathe adequately. Many were unable to complete the questionnaire by themselves because they felt so ill. Patients who realized that smoking contributed to the deterioration of their lungs and felt more stress due to their ailing health and subsequent admission to hospital may have had greater incentive to reduce their smoking.

The analysis also revealed that subjects who perceived a greater amount of support from their doctor when deciding to reduce or quit had significantly greater reduction in smoking than subjects who perceived less support from their doctor. This finding is supported by the literature studying social support and smoking cessation as reviewed earlier.

Qualitative Results

As well as examining the role of psychosocial factors in smoking reduction, this study aimed to evaluate subjects' perceptions of the influence of smoking cessation literature provided by the hospital. Several questions were posed to subjects at follow-up to reveal their thoughts on the relationship between smoking and pneumonia, the literature they were given to assist with quitting, and their preferred means of support for cessation while in hospital.

Almost one third (31.8%) of subjects felt there was an association between acquiring pneumonia and being a smoker while slightly more than one quarter (27.3%) had no previous awareness of the medical connection between pneumonia and smoking.

Only one subject who responded stated that hospitalization for pneumonia was incentive to quit smoking.

With respect to the smoking cessation literature provided to subjects, 64.1% reported reading them. The average score on a scale that assessed the helpfulness of the brochures from 1 (strongly agree) to 5 (strongly disagree) was 2.29. Almost half (47.8%) of the subjects reported there was nothing especially helpful about the brochures. Twenty-two percent (21.7%) stated the brochures were helpful with respect to quitting.

Literature that studied various smoking cessation interventions revealed that adding a cessation intervention to the usual care provided produced mixed results. Ninety percent of the studies reviewed had multiple or intensive intervention methods. Fifty percent of these studies showed statistically significant differences in smoking cessation between intervention and control or usual care groups. Although the vast majority of studies utilized multiple interventions to support smoking cessation, Orleans et al. (1993) purported that the most effective components of multicomponent treatment have not been identified. Given that only two thirds of the subjects read the brochures, almost half felt they were not helpful and findings in the literature focus on multiple interventions, the provision of a minimal intervention such as two smoking cessation brochures to hospitalized patients does not appear to be an effective treatment for smoking cessation.

A common theme among subjects' responses was a preference for quitting on their own. Emmons and Goldstein (1992) found that subjects in their study also preferred quitting on their own versus using formal treatment options. None of the subjects in this study reported feeling strongly that interventions such as doctor's advice, counseling from a smoking cessation expert, nicotine replacement therapy, self- help manuals, etc.

would help them with attempting to quit. As well, 69.4% of subjects commented that no further support could have been provided to them while in hospital with respect to quitting. Subjects' determination to quit smoking independently further supports the premise that provision of two brochures in hospital would have limited success in smoking reduction or cessation.

Overall, a minimal intervention of two smoking cessation brochures provided to hospitalized smokers does not appear to be effective. This study suggests, as does the literature, that brief physician advice is a valuable method of aiding smoking reduction. Physician advice is known to be a cost effective intervention relative to others. Use of social support from patients' partners and best friends to assist in smoking reduction would also be worth further investigation. Healthcare staff could advise family and friends to encourage patients to quit. Further research into the effect of perceived stress in smoking reduction may also help illuminate the findings from this study.

Although readiness to quit smoking was not a significant predictor of reduction, the average score of patients in this study was 8 on a scale from 0 to 10. A score of eight indicates patients are in the preparation phase of behavior change. Determining what intervention might encourage patients to move to the action stage would be worthy of study. Specifically, an RCT studying patients preferred sources of help – physician's advice, bedside counseling from a smoking cessation expert, telephone support calls and NRT with a longer follow-up period is the recommendation from the findings of this research. Given the differences in smoking prevalence amongst the five risk levels, it would be beneficial to analyze results based on these groups as intervention effectiveness may vary.

Limitations

Several limitations were observed throughout the completion of this study. Most notably, the sample size was small and therefore limits the ability of the findings to be generalized to the population at large. Lack of enrolment into the study was disappointing given the number of potential subjects to recruit. Of all patients admitted to hospital with community acquired pneumonia, 804 (23.7%) were smokers. The Pneumonia Pathway was conducted over the course of two years within six hospitals. Recruitment into this study lasted eleven months incorporating four of the hospitals. The two hospitals not utilized in the study were significantly smaller than the others, located in small communities outside of Edmonton. A total of 43 patients were referred to the researcher by the Pneumonia Pathway nurses for potential recruitment. Twenty-four (24) of these patients consented to participate in the study.

Given the size of the smoking population within the pathway and the minimal inclusion/exclusion criteria of the study, the sample size was surprisingly small. The estimated number of potential subjects over the 11 month recruitment period was 250 patients. Due to the ethical restriction that required an unbiased third party to approach patients for involvement in the study, it was impossible to determine the number of patients who met the criteria and the number who were actually approached by the nurses.

Another limitation of this research was lack of a control group. The design of this study, one-group pretest-posttest design, is considered to be weak within the realm of experimental design. Given the insufficient number of subjects after six months of sampling, a comparison group was added to the study. Due to time and resource

constraints, the comparison group of orthopedic patients was a convenience sample. Enlarging this population to other surgical and medical patients may have changed the outcome when the two study groups were compared. The comparison group was not significantly different from the pneumonia group and thus data analysis was based on the two groups pooled together. Obviously the impact of the smoking cessation information package on smoking status cannot be directly evaluated without a control group. The outcome could be compared to other hospital-based studies, however no other studies examine this specific population.

The use of self-report for subjects' smoking status might also be considered a limitation. As discovered in the literature review, there was inconsistency in the use of self-report versus biochemical validation of smoking status. However, a study conducted on the accuracy of information on smoking habits provided on self-administered questionnaires found that self-report was highly accurate (Petitti, Friedman, & Kahn, 1981).

Another study examined the usefulness of biochemical validation in low-intensity intervention trials. Results showed that it was not useful or cost-effective in work-site, self-help, community and mass media trials where evaluation is separated from intervention (Glasgow, Mullooly, Vogt, Stevens, Lichtenstein, Hollis, Lando, Severson, Pearson, & Vogt, 1993).

A third study found less unequivocal results about the use of self-report. This research suggested that biochemical validation was useful in intervention studies, studies with student populations, and studies with self-administered versus interviewer-administered questionnaires (Patrick, Cheadle, Thompson, Diehr, Koepsell, & Kinne,

1994). Generally the literature reflects that self-report is accurate, particularly in certain circumstances. However, given that this study examined a smoking cessation intervention and was partially self-administered, results may have more power in future studies if biochemical verification is employed, where resources are available.

Follow-up period is another factor which also had inconsistent findings in the literature. The range for this period was 4 weeks to 52 weeks, not including the studies that provided questionnaires only prior to hospital discharge. The mean follow-up time was 26 weeks and the median was 24 weeks. Time constraints for this study however, precluded a follow-up period any longer than 8 weeks. In a future study, follow-up periods at 6 and 12 months would be preferred to determine longer range cessation rates. Psychosocial variables could also be reassessed at follow-up to determine the relationship between these factors and cessation at both time periods.

Another limitation was the measurement tools, which always pose risk for validity issues. Fortunately, some measures were specific to smoking cessation. As well, most measures appeared to have reasonable validity and reliability. These tools however, measured subjective psychosocial information and may be less accurate than those that measure objective, physiological phenomena.

A second interviewer was utilized for enrolment and administration of the baseline survey to comparison group subjects as the researcher was involved with some of these patients in another capacity. The second interviewer was appointed to eliminate potential bias and conflict of interest. As the comparison group was added to the study well into the recruitment period, there was not sufficient time to establish inter-rater reliability, thus creating a possible limitation in the research.

Lastly, increased breadth and depth to the qualitative component of the follow-up questionnaire would have provided further enlightenment on subjects' preferences for in hospital and post discharge smoking cessation support. Either an in person interview or recording of telephone interview responses may have allowed for more meaningful analysis of this subject.

Health Promotion Implications

Given the empirically established relationship between smoking and contracting community acquired pneumonia, there is a significant need for health promotion interventions within this population. Smokers constitute 24% of patients with this type of pneumonia, which is higher than the 21% of smokers within the general population (Health Canada, 2002). This study reveals that patients hospitalized with pneumonia have greater reductions in their smoking post discharge than smokers hospitalized for non-lung related conditions. Smoking cessation interventions should target this prevalent population of smokers that are relatively successful with reduction and cessation.

It was hypothesized that patients experience increased levels of stress due to hospitalization and the awareness that their smoking had significantly impaired their health. Since study results illustrated that patients with higher levels of stress had greater reductions in smoking, health practitioners should encourage patients to consider or attempt reduction or cessation by consistently providing education on the risk of acquiring pneumonia and the deleterious effects on health due to smoking. Patient education is productive if it provides incentive to quit smoking, even if it increases patients' stress levels.

A final implication for health promotion is the role of physician intervention.

Russell et al. (1982) reported that simple physician advice to quit smoking yielded a 5-7% long-term cessation rate. Law and Tang (1995) found physicians who provided advice and encouragement to quit during a single routine visit resulted in a 2% cessation rate without relapse within the first year. This study revealed that patients who perceived more support from their doctor when deciding to reduce or quit had greater reductions in smoking than those patients who perceived less support. If all physicians inquired about their patients' smoking status and provided brief advice to quit, increase in cessation rates could be substantial.

Conclusion

The Pneumonia Pathway was utilized from November 2000 to November 2002 in the Capital Health Region to ensure efficient and consistent medical treatment for patients diagnosed with community acquired pneumonia. As part of the pathway, patients admitted to hospital were screened for their smoking status and provided with two smoking cessation brochures if they currently smoked. This study enrolled Pneumonia Pathway patients who smoked from four of the six hospitals in Capital Health from November 2001 to October 2002. The goal of this research was to examine the effectiveness of the two smoking cessation brochures in promoting smoking reduction within the context of psychosocial variables that relate to smoking and cessation. It was hypothesized that post-hospitalization smoking reduction would be higher among patients that reported (1) greater quitting self-efficacy, (2) greater social support, (3) lower perceived stress, (4) lower nicotine dependence, (5) greater readiness to stop smoking, and (6) greater perception that hospitalization was due to smoking.

Due to unanticipated low enrolment of subjects, a comparison group of

hospitalized patients who smoked but did not have a lung-related condition was added to increase the study sample size. Twenty-four pneumonia group subjects and twenty-three comparison group subjects were recruited. Patients in both groups were provided with a self-administered questionnaire that measured demographic variables, smoking characteristics and psychosocial factors. After completion of the questionnaire, patients were provided with a minimal intervention of the two smoking cessation brochures. Two months following the intervention, patients were telephoned at home and asked to respond to a brief follow-up questionnaire. At this time, smoking status was determined and patients were also asked questions relating to the two brochures and preferred types of smoking cessation support during hospitalization.

Of the twenty-eight variables measured at baseline, five revealed a significant difference between the two groups. The pneumonia group exhibited greater nicotine dependence, felt more strongly that their partners and best friends were important when deciding to reduce or quit, perceived they had a greater likelihood of acquiring a future smoking related illness, and felt more strongly that their hospital admission was related to their smoking. At the two month follow-up, the groups did not show a significant difference with respect to any of the variables measured.

Longitudinal predictors of smoking were analyzed using two outcome measures that assessed the magnitude of reduction in patients' smoking. One measure was calculated by subtracting patients' daily smoking level on the day of follow-up from the daily smoking level prior to admission. The second measure was calculated by subtracting the average smoking level in the last 2 months (at follow-up) from the average smoking level in the 30 days prior to enrolment. Setwise hierarchical multiple

regression analysis, specifically analysis of partial variance, was used to test the study hypotheses.

Four variables were found to be significantly predictive of changes in smoking during the two month period between study enrolment and follow-up: (1) average number of cigarettes smoked in the month before follow-up, (2) amount of perceived stress experienced in the month prior to enrolment, (3) perceived support from the doctor when deciding to quit, and (4) study group. Patients with higher levels of stress unexpectedly had greater reduction in smoking. As hypothesized, patients with more perceived support from their doctor had greater reduction in smoking. Patients who belonged to the pneumonia group also had greater reduction in smoking.

Two variables were significantly predictive of changes in smoking on the day of follow-up: (1) number of cigarettes smoked on a typical day pre-admission and (2) patient gender. Male subjects had greater smoking reduction on the day of follow-up than female subjects.

Analysis of the effectiveness of the smoking cessation brochures revealed that while 64% of the patients actually read the materials, 49% did not find the brochures to be helpful. Thirteen percent (13%) of the subjects could not recall the brochures, while 35% commented they provided helpful information about quitting or clearly explained the detriments of smoking. Although almost half of the patients found nothing helpful about the brochures, only 12% commented negatively about the brochures by indicating they did not contain any new information.

When patients were questioned about their preferences for alternative forms of cessation support in hospital and post-discharge the average response ranged from

strongest to weakest preference as follows: doctor's advice, bedside counseling from a smoking cessation expert, post-hospitalization telephone support calls, nicotine replacement therapy, videotapes, and finally self-help manuals. Most patients felt their questions relating to smoking were adequately answered while in hospital and 69% felt no further support could have been provided to them during their stay.

Of the five psychosocial variables measured, only one hypothesis was verified – patients with higher levels of social support would have greater reductions in smoking after hospitalization. Previous studies found in the literature substantiate this finding. Interestingly, the analysis relating to stress and smoking reduction proved to be significant but contrary to what was hypothesized. Perhaps stress provided an impetus to reduce or quit if patients' stress was caused by poor health resulting from smoking.

The smoking cessation brochures appeared to have limited effectiveness. Fifty-six percent of patients who made a quit attempt after hospital discharge tried to do so on their own. Only 18% of patients tried treatment or a program to help them reduce or quit and no patients attributed their success to the hospital brochures. The most preferred source of support for cessation in hospital was doctor support. This fact corresponds with the finding that subjects with more support from their doctors had a greater reduction in smoking than those with less support. Furthermore, smoking cessation literature reveals that brief physician support can increase cessation rates by up to 7%.

Small sample size and lack of a control group were two primary limitations of this study, however given the lack of research with this specific population the results were intriguing and warrant further investigation. There is a relatively high prevalence of smokers within the community acquired pneumonia population. As they appear to

achieve greater rates of smoking reduction than other hospitalized patients, the health care system would benefit by targeting health promotion interventions at this group of smokers.

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Review of Studies Examining Hospital-based Smoking Cessation Interventions

Appendix 1

Table 1

Review of Studies Examining Hospital-based Smoking Cessation Interventions

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Taylor, Houston-Miller, Killen, DeBusk, 1990	Sequential sample of 173 patients. Randomly assigned to intervention or usual care.	Randomized 6-month treatment period, 6-month follow-up.	Nurse delivered. Focus on preventing relapse. Initiated in hospital, maintained after discharge through phone contact. Counseling, manual, audiotapes used.	Follow-up one year after hospital discharge. Biochemical validation used.	Cessation rate: 71% intervention vs. 45% usual care. Considering patients lost to follow-up: 61% intervention vs. 32% usual care. $p=0.001$.
Smoking Cessation After Acute Myocardial Infarction			Measured smoking cessation rate, self-efficacy, nicotine dependency, intention to quit, depression, and social support.		Smoking status at 3 weeks and self-efficacy significantly related to smoking status at 12 months.

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Johnson, Budz, Mackay, Miller, 1999	102 cardiac patients admitted for medical or surgical treatment.	Quasi-experimental Non-equivalent control group.	Two structured in hospital contacts, focusing on problem solving and self-efficacy followed by 3 months of phone support.	Baseline and at 6 months after initial contact.	Cessation rate: 46% intervention vs. 31% control group. $p=0.23$.
Evaluation of a Nurse-delivered Smoking Cessation Intervention for Hospitalized Patients with Cardiac Disease			Measured smoking status, self-efficacy, dependence, social support, stress.	Self-report used.	No significant differences in self-efficacy at f/u.
Stanislaw, Wewers, 1994	26 hospitalized surgical oncology patients.	Randomized two-group experimental design.	Structured smoking cessation intervention (3 nurse visits) during hospitalization. Counseling, booklet, audiotape used.	Follow-up occurred at 5 weeks post discharge.	Cessation rate: 75% intervention vs. 42.9% usual care. $P<0.01$.
A Smoking Cessation Intervention with Hospitalized Surgical Cancer Patients: A Pilot Study			Measured smoking status.	Biochemical validation used.	

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Griebel, Wewers, Baker, 1998 The Effectiveness of a Nurse-managed Smoking Cessation Intervention Among Patients with Cancer	28 patients with a diagnosis of cancer, hospitalized for a surgical procedure.	Prospective, two-group, randomized clinical trial.	One-time intervention provided by nurse. Counseling, booklet, 5 weekly phone calls used. Measured smoking status.	Follow-up occurred at 6 weeks post intervention. Self-report and biochemical validation used.	Cessation rate: 21% intervention vs. 14% usual care. Not statistically significant.
Simon, Solkowitz, Carmody, Browner, 1997 Smoking Cessation after Surgery: A Randomized Trial	324 patients having undergone noncardiac surgery.	Randomized control trial.	Intervention included counseling, videotape, self-help literature, NRT, 3 months of phone follow-up. Measured smoking status.	Follow-up at 6 and 12 months. Self-report and biochemical validation used.	12 month cessation rate: 27% intervention vs. 13% usual care (self-report). $p < 0.01$. 15% intervention vs. 8% usual care (biochemical validation). $p = 0.04$

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Haddock, Burrows, 1997 The Role of the Nurse in Health Promotion: An Evaluation of a Smoking Cessation Programme in Surgical Pre-admission Clinics	Convenience sample of 60.	Quasi-experimental design, subjects randomized.	Nurse provided educational interventions and self-assessment questionnaires at pre-admission clinic. Measured intention to stop, level of addiction, knowledge of health-related risks, susceptibility to risks, values about health, self-esteem, social support.	Follow-up occurred upon admission to hospital. Self-report used.	Control group: 50% reduced or stopped before admission, 43% stayed the same, 7% smoked more. Intervention group: 80% reduced or stopped, 10% stayed the same, 10% smoked more. $p < 0.01$.

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Wewers, Stanislaw, 1994 A Nurse Delivered Smoking Cessation Intervention Among Hospitalized Postoperative Patients-Influence of a Smoking-related Diagnosis: A Pilot Study	80 postoperative patients from cardiovascular, oncology, and general surgical units.	Prospective, experimental, random assignment.	Three structured interventions during hospitalization (counseling, booklet, audiotape), followed by 5 weekly phone calls. Measured smoking status.	Follow-up occurred 5 to 6 weeks after discharge. Self-report and biochemical validation used.	Cessation rate: 37.8% intervention vs. 25.6% usual care. Not significant. Significance was found when each diagnostic group was examined individually.

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Vernon, Crane, Prochazka, Fairclough, MacKenzie, 1999	154 patients admitted to a medicine service.	Cross-sectional.	Patients provided with educational materials, free outpatient cessation classes, nicotine patches.	Questionnaire provided during hospital admission.	Patient belief in an association between smoking and hospital admission was significantly correlated with a higher stage of change, higher nicotine dependency, and greater 1-week self-efficacy.
Smokers Hospitalized in an Urban, Public Hospital: Addiction, Stages of Change, and Self-efficacy			Measured stage of change, nicotine dependence, self-efficacy		
Rigotti, Arnsten, McKool, Wood-Reid, Pasternak, Singer, 1997	650 patients admitted to medical and surgical services.	Randomized controlled trial.	Intervention consisted of 1 bedside counseling session, written self-help material, physician chart prompt, 3 weekly phone calls after discharge.	Follow-up occurred at 1 and 6 months after discharge.	One month: 28.9% intervention vs. 18.9% control (self-report). $p=0.003$. 6 months: no statistically significant differences by either self-report or biochemical validation.
Efficacy of a Smoking Cessation Program for Hospital Patients			Measured smoking status.	Self-report and biochemical validation was used.	

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Haire-Joshu, Ziff, Houston, 1995	59 smokers identified. 91% refused to participate. n=3.	Not indicated.	Intervention consisted of outpatient counseling, mailed information, 8 weekly phone calls.	Not indicated.	Not indicated.
The Feasibility of Recruiting Hospitalized Patients with Diabetes for a Smoking Cessation Program					
Stevens, Glasgow, Hollis, Lichtenstein, Vogt, 1993	1119 subjects, all hospitalized smokers.	Randomized	Intervention included bedside counseling session, videotape, self-help materials, and follow-up phone call.	Follow-up occurred at 3 and 12 months after hospitalization.	Cessation rate: 13.5% intervention vs. 9.2% usual care. $P=0.023$
A Smoking Cessation Intervention for Hospital Patients			Measured smoking status.	Self-report and biochemical validation was used.	

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Taylor, Houston-Miller, Herman, Smith, Sobel, Fisher, DeBusk, 1996	660 patients.	Randomized	Intervention included meeting with nurse-case manager, videotape, workbook, relaxation audiotape, NRT, phone follow-up.	Follow-up at 12, 24 and 52 weeks. Self-report and biochemical validation were used.	12 month cessation rate: 31% intervention vs. 21% usual care (verified). $p=0.006$.
A Nurse Managed Smoking Cessation Program for Hospitalized Smokers			Measured smoking status, dependency.		

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Houston-Miller, Smith, DeBusk, Sobel, Taylor, 1997 Smoking Cessation in Hospitalized Patients: Results of a Randomized Trial	2024 patients randomly assigned to usual care or one of two intervention groups.	Randomized control trial.	Intervention number one (minimal intervention) consisted of counseling plus one phone contact post discharge. The second intervention (intensive intervention) was the same except it included 4 phone calls instead. Measured smoking status.	Follow-up occurred at one year. Self-report, family confirmation and biochemical validation was used.	Cessation rate: 27% intensive intervention, 22% minimal intervention, 20% usual care. $p=0.009$ for intensive vs. usual care.
Stevens, Glasgow, Hollis, Mount, 2000 Implementation and Effectiveness of a Brief Smoking Cessation Intervention for Hospital Patients	1173 patients.	Randomized controlled clinical trial.	Intervention included bedside counseling, videotape, self-help materials, and a follow-up phone call. Measured smoking status, intention to quit.	Follow-up occurred at one year. Self-report was used.	Cessation rate: 14.2% intervention vs. 13.6% usual care. Not significant.

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Rigotti, Arnsten, McKool, Wood-Reid, Singer, Pasternak, 1999	650 patients admitted to the medical and surgical services.	Prospective, observational study within a randomized smoking intervention trial.	Intervention included brief bedside counseling. NRT was not a component of the intervention. Outcome measure was inpatient pharmacy records of nicotine patch or gum use.	Follow-up was at 1 and 6 months. Self-report and biochemical validation was used.	Only 5.2% of hospitalized smokers received NRT during their stay, including only 9.6% of those who reported difficulty refraining while in hospital and 9.0% with nicotine withdrawal.
The Use of Nicotine Replacement Therapy by Hospitalized Smokers			Measured nicotine withdrawal, intention to quit and smoking status.		

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Martin, Robinson, 1995 The Safety, Tolerability and Efficacy of Transdermal Nicotine (Nicotinell TTS) in Initially Hospitalized Patients	80 patients.	Open, noncomparative study.	Intervention included transdermal nicotine system (24 hour patches) and simple support for 12 weeks. Measured smoking status, dependency.	Follow-up occurred at 3 and 6 months. Self-report and biochemical validation used.	Cessation rate: at 3 months 21% were non-smokers, 26% had reduced their smoking and 12.5% were still smokers. At 6 months 23.75% were non-smokers (self-report), 27.5% (verified)

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Lewis, Piasecki, Fiore, Anderson, Baker, 1998	185 patients.	Randomized, double-blind, placebo-controlled study.	Three interventions: 1) minimal care included physician delivered motivational message, 2) counseling plus active nicotine patch, 3) counseling plus placebo nicotine patch.	Follow-up at 6 months.	Cessation rate: 4.9%, 9.7% and 6.5% for interventions 1), 2), and 3) respectively. Not significantly.
Transdermal Nicotine Replacement for Hospitalized Patients: A Randomized Clinical Trial			Measured dependency, confidence to remain smoke-free, motivation to quit, prevalence of smoking among family/friends, social support, smoking status.	Self-report and biochemical validation used.	
Bittoun, McMahon, Bryant, 1991	311 patients.	Survey of patients' overt and covert smoking.	Measured smoking status.	Questionnaire given during hospital stay.	20% admitted to smoking while in hospital. 8% denied smoking but were verified as smokers biochemically.
Smoking in Hospitalized Patients				Self-report and biochemical validation used.	

Author(s) and Study	Sample	Design	Intervention/Measures	Follow-up Period/Self-report Versus Biochemical Validation	Results
Glasgow, Stevens, Vogt, Mullooly, Lichtenstein, 1991	526 patients.	Survey to assess the natural history of smoking cessation associated with hospitalization.	Measured 3 events: 1) not smoking while hospitalized, 2) attempting to quit following hospitalization, 3) smoking status 1 year after discharge.	Follow-up occurred 1 year after hospitalization. Self-report used.	Event 1) 51% of subjects, 2) 37%, 3) 16% abstinent. Older patients and those with circulatory or respiratory conditions were significantly more likely to stop smoking. Those living with a partner were more likely to stop.
Changes in Smoking Associated with Hospitalization: Quit Rates, Predictive Variables, and Intervention Implications					
Emmons, Goldstein, 1992	304 patients in a specialized cardiovascular disease unit and a general medical unit.	Descriptive study.	Measured smoking prevalence and interest in cessation, and efforts of hospital staff to promote cessation.	All questionnaires were completed prior to hospital discharge. Self-report used.	Smoking prevalence was 16%. 79% indicated a desire to quit. Little interest in using formal treatment. More staff (physicians and nurses) on cardiovascular unit encouraged cessation than staff on general medical unit.
Smokers Who are Hospitalized: A Window of Opportunity for Cessation Interventions			Used Contemplation Ladder to assess readiness to quit.		

Appendix 2

Pneumonia Nurses Consent Form for Researcher to Visit Patients

Pneumonia and Smoking Study

A study is being carried out at this hospital looking at patients in hospital with community acquired pneumonia and smoking. The results of the study will help researchers better understand the relationship between smoking and pneumonia. The study will help improve the support provided to patients who want to quit. The study will also give us helpful information about those people who are *not* interested in quitting smoking.

Being involved in the study will include filling out a survey while you're in hospital and answering a survey over the phone 2 months later. The first survey will take about 15 minutes, the second survey will take about 5 minutes.

The survey questions will ask about 1) your background information (age, education, etc.); 2) your smoking history and present smoking status; 3) factors that may relate to quitting smoking (confidence to quit, stress, social support, etc.) and 4) your thoughts about information that will be provided to you in hospital on quitting smoking.

Your name and all information you provide will be kept private.

If you would like to learn more about this study, please sign at the bottom of the form. Your signature consents to the researcher coming to see you to tell you more about this study. You can decide at that time if you would like to participate.

Thank you for your interest.

Name: _____

Signature: _____

Date: _____

Appendix 3

Pneumonia Group Information Sheets for Capital Health and Caritas Patients

Information Sheet

Title of Project: Tobacco Use Among Hospital Patients

Investigators: Patti Seed University of Alberta (MSc student), Dr. Cam
Wild, University of Alberta), Dr. Tom Marrie

Patti Seed is working with Capital Health to learn about the use of stop smoking information given to patients who currently smoke and are in hospital with pneumonia. The purpose of this study is to help us understand how patients in the hospital with pneumonia quit smoking. The results of the study will help us give better support to patients trying to quit.

We will be asking current smokers who are in hospital with pneumonia to fill out a short survey before they leave the hospital. This will take no more than 15 minutes. Two months later we will phone you to ask you some questions. This will take no more than 5 minutes.

The first survey asks about your age, education, and other background information. We will also ask about your smoking history and how much you smoke now. The survey will also ask about how sure you feel about being able to quit, how much social support you feel you have to quit, how much stress you are feeling, how physically dependent you are on tobacco, how ready you feel to quit, and how you feel smoking relates to being in the hospital.

The second survey will ask about how much you smoke. We will also ask about your thoughts on the stop smoking information you were given while in hospital.

If you agree to take part in the study, the first survey will be given to you to finish while you are in the hospital. The second survey will be done two months later, by phone. The same person will give you both surveys.

All information will be kept private except when codes of ethics or the law requires reporting. Your name will be kept private, and only a code number will be used on the survey forms. Nobody will ever be able to link your answers to you personally. You can refuse to answer any questions and you can quit the study at any time. Your care while in hospital or after discharge will not be affected if you decide to quit the study.

All information you give on the survey will be kept private. The report from the study will not identify you personally in any way. Only the research staff will have access to the information you supply. Staff that give you care while you are in the hospital or after will not have access to your information. All study data will be kept for at least five years after the study has been finished, in a secure area only the research team can access.

If you have any concerns about the way the study is carried out, please call Dr. Douglas Wilson at the Centre for Health Promotion Studies

Information Sheet

Title of Project: Tobacco Use Among Hospital Patients

Investigators: Patti Seed

University of Alberta (MSc student), Dr. Cam

Wild, University of Alberta

Dr. Tom Marrie

Patti Seed is working with Capital Health to learn about the use of stop smoking information given to patients who currently smoke and are in hospital with pneumonia. The purpose of this study is to help us understand how patients in the hospital with pneumonia quit smoking. The results of the study will help us give better support to patients trying to quit.

We will be asking current smokers who are in hospital with pneumonia to fill out a short survey before they leave the hospital. This will take no more than 15 minutes. Two months later we will phone you to ask you some questions. This will take no more than 5 minutes.

The first survey asks about your age, education, and other background information. We will also ask about your smoking history and how much you smoke now. The survey will also ask about how sure you feel about being able to quit, how much social support you feel you have to quit, how much stress you are feeling, how physically dependent you are on tobacco, how ready you feel to quit, and how you feel smoking relates to being in the hospital.

The second survey will ask about how much you smoke. We will also ask about your thoughts on the stop smoking information you were given while in hospital.

If you agree to take part in the study, the first survey will be given to you to finish while you are in the hospital. The second survey will be done two months later, by phone. The same person will give you both surveys. We would also like to review your hospital record to find out how severe your pneumonia is.

All information will be kept private except when codes of ethics or the law requires reporting. Your name will be kept private, and only a code number will be used on the survey forms. Nobody will ever be able to link your answers to you personally. You can refuse to answer any questions and you can quit the study at any time. Your care while in hospital or after discharge will not be affected if you decide to quit the study.

All information you give on the survey will be kept private. The report from the study will not identify you personally in any way. Only the research staff will have access to the information you supply. Staff that give you care while you are in the hospital or after will not have access to your information. All study data will be kept for at least five years after the study has been finished, in a secure area only the research team can access.

Possible risks from being in the study may include emotional upset if you try to quit smoking and are unable. In such cases, we would suggest you seek support from your

family physician and/or the support groups for quitting smoking which will be given to you in the hospital.

If you have any concerns about any aspect of this study, you may contact the Corporate Hospital Officer at the Caritas Health Group at This office has no affiliation with the study investigators.

Appendix 4

Pneumonia Patients Consent Form

Consent Form

ID Code _____

98

Title of Project: Tobacco Use Among Hospital Patients

Investigators: Patti Seed

University of Alberta (MSc student), Dr. Cam

Wild, University of Alberta

Dr. Tom Marrie

Do you understand that you have been asked to be in a research study? Yes No

Have you read and received a copy of the attached Information Sheet? Yes No

Do you understand the benefits and risks involved in taking part in this research study? Yes No

Have you had an opportunity to ask questions and discuss the study? Yes No

Do you understand that you are free to refuse to participate or withdraw from the study at any time? You do not have to give a reason and it will not affect your care. Yes No

Has the issue of confidentiality been explained to you? Yes No

Do you understand who will have access to your records? Yes No

This study was explained to me by:

I agree to take part in this study. Yes No

Signature of Research Participant

Signature of Witness

Date

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee

Date

Appendix 5

Pneumonia Patients Baseline Questionnaire

**Tobacco Use Among Hospital Patients
Baseline Survey**

ID Code _____

100

Part 1- About You

1) What is your gender?

Female

☐

Male

☐

(Check One)

2) What is your age?

_____ years

3) What is your marital status?

Single

☐

Married

☐

Separated

☐

Divorced

☐

Widowed

☐

4) What is your highest level of education?

Elementary school

☐

Some high school

☐

High school graduate

☐

Some university

☐

University graduate

☐

Postgraduate

☐

5) What is your household income?

Below \$10 000

☐

Between \$11 000 and \$20 000

☐

Between \$21 000 and \$40 000

☐

Between \$41 000 and \$75 000

☐

Over \$75 000

☐

Part 2- Your Smoking

6) Before you came to hospital, on a typical day, how much do you smoke?
_____ cigarettes

7) How many cigarettes have you smoked today?
_____ cigarettes

8) Think about the last 30 days. On the days that you smoked, how many cigarettes did you usually smoke?

(Check one)

- | | |
|----------------------------------|--------------------------|
| 1-2 cigarettes in a day | ☐ |
| 3-5 cigarettes in a day | ☐ |
| 6-10 cigarettes in a day | ☐ |
| 11-19 cigarettes in a day | ☐ |
| 20-25 cigarettes in a day | ☐ |
| More than 25 cigarettes in a day | ☐ |

9) How old were you when you smoked your first cigarette? _____ years old

10) How many times have you tried to quit smoking in the past? _____ times

11) Did you try to quit on your own?

(Check one)

- | | |
|-----|--------------------------|
| Yes | ☐ |
| No | ☐ |

12) Have you tried treatment and/or programs to quit smoking? (Check one)

- | | |
|-----|--------------------------|
| Yes | ☐ |
| No | ☐ |

13) What treatment and/or programs have you tried?

14) If you have stopped smoking in the past, what is the greatest length of time that you quit for?

15) How soon after you wake up do you smoke your first cigarette?

(Check One)

- | | |
|------------------|--------------------------|
| Within 5 minutes | ☐ |
| 6 - 30 minutes | ☐ |
| 31 - 60 minutes | ☐ |
| After 60 minutes | ☐ |

16) Do you find it difficult to refrain from smoking in places where it is forbidden, e.g. in church, at the library, cinema, etc.?

(Check one)

- | | |
|-----|--------------------------|
| Yes | ☐ |
| No | ☐ |

17) Which cigarette would you hate most to give up?

(Check one)

- The first one in the morning ☐
 All others ☐

18) How many cigarettes a day do you smoke?

(Check one)

- 10 or less ☐
 11 - 20 ☐
 21 - 30 ☐
 31 or more ☐

19) Do you smoke more frequently during the first hours after waking than during the rest of the day?

(Check one)

- Yes ☐
 No ☐

20) Do you smoke if you are so ill that you are in bed most of the day?

(Check one)

- Yes ☐
 No ☐

The following are some situations in which certain people might be tempted to smoke. Please indicate whether you are sure that you could refrain from smoking in each situation.

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutely sure
21) When I feel nervous.	1	2	3	4	5
22) When I feel depressed.	1	2	3	4	5
23) When I am angry.	1	2	3	4	5
24) When I feel very anxious.	1	2	3	4	5
25) When I want to think about a difficult problem.	1	2	3	4	5
26) When I feel the urge to smoke.	1	2	3	4	5

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutely sure
27) When having a drink with friends.	1	2	3	4	5
28) When celebrating something.	1	2	3	4	5
29) When drinking beer, wine or other spirits.	1	2	3	4	5
30) When I am with smokers.	1	2	3	4	5
31) After a meal.	1	2	3	4	5
32) When having coffee or tea.	1	2	3	4	5

 If you were to quit smoking, how much support would you get from your partner, doctor and best friend? Circle one.

33) Partner	1 No Support	2	3 Some Support	4	5 Lots of Support
34) Doctor	1 No Support	2	3 Some Support	4	5 Lots of Support
35) Best Friend	1 No Support	2	3 Some Support	4	5 Lots of Support

How much pressure have you felt from the following people to quit smoking?

36) Partner	1 No pressure	2	3 Some pressure	4	5 Lots of pressure
37) Doctor	1 No pressure	2	3 Some pressure	4	5 Lots of pressure
38) Best Friend	1 No pressure	2	3 Some pressure	4	5 Lots of pressure

How important are each of the following people in your decision to quit smoking or reduce your smoking?

39) Partner	1 Not important	2	3 Somewhat important	4	5 Very important
40) Doctor	1 Not important	2	3 Somewhat important	4	5 Very important
41) Best Friend	1 Not important	2	3 Somewhat important	4	5 Very important

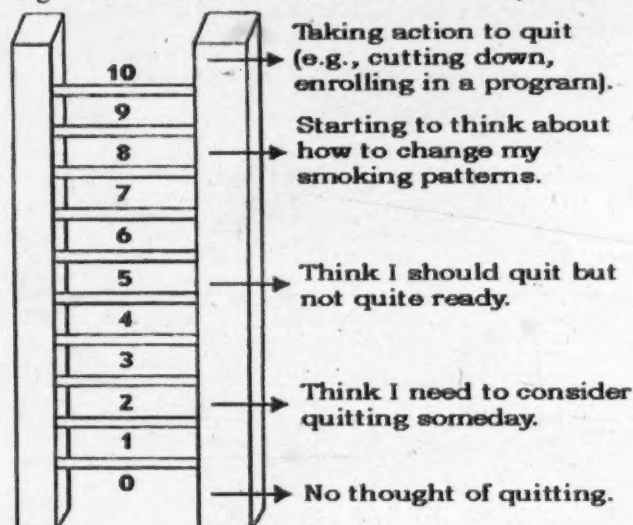
The following questions ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

In the last month...	Never 1	Almos t never 2	Some- times 3	Fairly often 4	Very Often 5
42) How often have you been upset because of something that happened unexpectedly?	1	2	3	4	5
43) How often have you felt that you were unable to control the important things in your life?	1	2	3	4	5
44) How often have you felt nervous and "stressed"?	1	2	3	4	5
45) How often have you dealt successfully with irritating life hassles?	1	2	3	4	5
46) How often have you felt that you were effectively coping with important changes that were occurring in your life?	1	2	3	4	5
47) How often have you felt confident about your ability to handle your personal problems?	1	2	3	4	5

In the last month...	Never	Almos t never	Some- times	Fairly often	Very Often
48) How often have you felt that things were going your way?	1	2	3	4	5
49) How often have you found that you could not cope with all the things that you had to do?	1	2	3	4	5
50) How often have you been able to control irritations in your life?	1	2	3	4	5
51) How often have you felt that you were on top of things?	1	2	3	4	5
52) How often have you been angered because of things that happened that were outside of your control?	1	2	3	4	5
53) How often have you found yourself thinking about things that you have to accomplish?	1	2	3	4	5
54) How often have you been able to control the way you spend your time?	1	2	3	4	5
55) How often have you felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

The next question asks about your readiness to quit smoking.

56) Each rung on the ladder represents where various smokers are in their thinking about quitting. Circle the number that indicates where you are now.



57) How likely is it that you will have a smoking-related illness (for example, lung cancer) at some time in the future?

1	2	3	4	5
definitely won't happen	probably won't happen	might happen	probably will happen	definitely will happen

58) How likely is it that you will have a smoking-related illness (for example, lung cancer) at some time in the future, compared to others your age?

1	2	3	4	5
definitely won't happen	probably won't happen	might happen	probably will happen	definitely will happen

59) In your opinion, is your smoking related to the reason you were admitted to the hospital?

Yes
No

(Check one)

☐
☐

60) What are your thoughts about smoking and pneumonia?

Thank you very much for completing the questionnaire!
Remember: all of your answers are completely anonymous

Appendix 6

Pneumonia Patients Follow-up Questionnaire

**Tobacco Use Among Hospital Patients
Follow Up Survey**

ID Code 109

Part 1-Smoking Status

1) How many cigarettes did you smoke today? _____ cigarettes

2) Think about the last 2 months. On the days that you smoked, how many cigarettes did you usually smoke?

(Circle one)

1-2 cigarettes in a day	1
3-5 cigarettes in a day	2
6-10 cigarettes in a day	3
11-19 cigarettes in a day	4
20-25 cigarettes in a day	5
More than 25 cigarettes in a day	6

Questions 3 to 8 relate to the time since you have been in the hospital for pneumonia.

3) How many times have you tried to quit smoking since you were in the hospital?
_____ times

4) Did you try to quit on your own?

Yes	1
No	2

5) Have you tried treatment and/or programs to quit smoking?

Yes	1
No	2

6) What treatment and/or programs have you tried?

7) What factors helped you to decide to try this treatment and/or program?

Doctor	1
Family	2
Friend	3
Hospital brochure	4
Other	5

8) If you have stopped smoking since you went into the hospital, what is the greatest length of time that you've quit for?

Part 2-Smoking Cessation Information Package

The following questions ask about the smoking cessation information you received in the hospital prior to your discharge.

9) Have you had time to read this information?

Yes 1
No 2

10) Right after you completed the first questionnaire for this study, during your hospital stay, you were given two brochures on quitting smoking: "Help to Quit Smoking: Programs and Resources" and "There's Never Been a Better Time to Quit Smoking". The brochures were helpful:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

11) If you found these brochures helpful, can you tell me what you found helpful about them?

12) If you did not find these brochures helpful, can you tell me what was not helpful about them?

13) Did you receive any other booklets on quitting smoking from the pneumonia nurse before you left the hospital?

Yes 1
No 2

14) These brochures were helpful:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

15) If you found this information helpful, can you tell me what you found helpful about it?

16) If you did not find this information helpful, can you tell me what was not helpful about it?

17) When you were in the hospital, your questions about pneumonia and/or quitting smoking were adequately answered:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

If you were thinking of quitting smoking while you were in the hospital, comment on how helpful the following would have been for you:

18) Doctor's advice

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

19) Bedside counseling from a smoking cessation expert

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

20) Nicotine replacement therapy (e.g. the nicotine patch, nicotine gum)

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

21) Self-help manuals

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

22) Videotapes

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

23) Telephone support calls

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

24) What other help or information could have been given to you in the hospital with regards to smoking?

Appendix 7

Orthopedic Nurses Consent Form for Researcher to Visit Patients

Hospitalization and Smoking Study

A study is being carried out at this hospital looking at patients who currently smoke. The study will compare patients who are admitted with pneumonia versus patients who are admitted for a non-lung related condition. The study aims to improve hospital information and resources given to patients who are interested in quitting. The study needs patients who range from no interest in quitting to those already trying to cut down or quit.

Being involved in the study will include filling out a survey while you're in hospital and answering a survey over the phone 2 months later. The first survey will take about 15 minutes, the second survey will take about 5 minutes.

The survey questions will ask about 1) your background information (age, education, etc.); 2) your smoking history and present smoking status; 3) factors that may relate to quitting smoking (confidence to quit, stress, social support, etc.) and 4) your thoughts about information that will be provided to you in hospital on quitting smoking.

Your name and all information you provide will be kept private.

If you would like to learn more about this study, please sign at the bottom of the form. Your signature consents to the researcher coming to see you to tell you more about this study. You can decide at that time if you would like to participate.

Thank you for your interest.

Name: _____

Signature: _____

Date: _____

Appendix 8

Orthopedic and Home Care Patients Information Sheet

Information Sheet
(Please Keep This Sheet for Your Reference)

Title of Project: Tobacco Use Among Hospital and Home Care Patients

Investigators: Patti Seed

University of Alberta (MSc student), Dr. Cam

Wild, University of Alberta

Dr. Tom Marrie

Patti Seed is working with Capital Health to learn about the use of stop smoking information given to patients who currently smoke and are in hospital with pneumonia. The purpose of this study is to help us understand how patients in the hospital with pneumonia quit smoking. To better understand this process, we are comparing this group of people to others. Other groups include patients hospitalized for a non-lung related condition, and patients with pneumonia but who are not hospitalized. The results of the study will help us give better support to patients trying to quit.

We will be asking current smokers to fill out a short survey. This survey will be filled out in hospital if you fall within the group of people in the hospital. You may also be given the survey from a Home Care staff person. The survey will take about 15 minutes to fill out. Two months later we will phone you to ask you some follow-up questions. This will take no more than 5 minutes.

The first survey asks about your age, education, and other background information. We will also ask about your smoking history and how much you smoke now. The survey will also ask about how sure you feel about being able to quit, how much social support you feel you have to quit, how much stress you are feeling, how physically dependent you are on tobacco, and how ready you feel to quit.

The second survey will ask follow-up questions about how much you smoke at that time. We will also ask about your thoughts on the stop smoking information you were given while in hospital or by Home Care staff.

All information will be kept private except when codes of ethics or the law requires reporting. Your name will be kept private, and only a code number will be used on the survey forms. Nobody will ever be able to link your answers to you personally. You can refuse to answer any questions and you can quit the study at any time. Your care while in hospital or after discharge will not be affected if you decide to quit the study.

All information you give on the survey will be kept private. The report from the study will not identify you personally in any way. Only the research staff will have access to the information you supply. Health care staff that give you care while you are in the hospital or at home will not have access to your information. All study data will be kept for at least five years after the study has been finished, in a secure area only the research team can access.

If you have any concerns about the way the study is carried out, please call the Capital Health Patient Relations Department at

Appendix 9

Orthopedic Patients Consent Form

Consent Form

Title of Project: Tobacco Use Among Hospital Patients**Investigators:** Patti Seed

University of Alberta (MSc student), Dr. Cam

Wild, University of Alberta

Dr. Tom Marrie

Do you understand that you have been asked to be in a research study? Yes No

Have you read and received a copy of the attached Information Sheet? Yes No

Do you understand the benefits and risks involved in taking part in this research study? Yes No

Have you had an opportunity to ask questions and discuss the study? Yes No

Do you understand that you are free to refuse to participate or withdraw from the study at any time? You do not have to give a reason and it will not affect your care. Yes No

Has the issue of confidentiality been explained to you? Yes No

Do you understand who will have access to your records? Yes No

This study was explained to me by:

I agree to take part in this study. Yes No

Signature of Research Participant_____
Signature of Witness_____
Date

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee_____
Date

Appendix 10

Orthopedic Patients Baseline Questionnaire

Hospitalization and Smoking Study

CG ID Code 121

Part 1- About You

1) What is your gender?

(Check One)

Female

☐

Male

☐

2) What is your age?

_____ years

3) What is your marital status?

Single

☐

Married

☐

Separated

☐

Divorced

☐

Widowed

☐

4) What is your highest level of education?

Elementary school

☐

Some high school

☐

High school graduate

☐

Some university

☐

University graduate

☐

Postgraduate

☐

5) What is your household income?

Below \$10 000

☐

Between \$11 000 and \$20 000

☐

Between \$21 000 and \$40 000

☐

Between \$41 000 and \$75 000

☐

Over \$75 000

☐

Part 2- Your Smoking

6) On a typical day, how much do you smoke?

_____ cigarettes

7) How many cigarettes have you smoked today?

_____ cigarettes

8) Think about the last 30 days. On the days that you smoked, how many cigarettes did you usually smoke?

(Check one)

- | | |
|----------------------------------|--------------------------|
| 1-2 cigarettes in a day | ☐ |
| 3-5 cigarettes in a day | ☐ |
| 6-10 cigarettes in a day | ☐ |
| 11-19 cigarettes in a day | ☐ |
| 20-25 cigarettes in a day | ☐ |
| More than 25 cigarettes in a day | ☐ |

9) How old were you when you smoked your first cigarette? _____ years old

10) How many times have you tried to quit smoking in the past? _____ times

11) Did you try to quit on your own?

(Check one)

- | | |
|-----|--------------------------|
| Yes | ☐ |
| No | ☐ |

12) Have you tried treatment and/or programs to quit smoking?

(Check one)

- | | |
|-----|--------------------------|
| Yes | ☐ |
| No | ☐ |

13) What treatment and/or programs have you tried?

14) If you have stopped smoking in the past, what is the greatest length of time that you quit for?

15) How soon after you wake up do you smoke your first cigarette?

(Check One)

- | | |
|------------------|--------------------------|
| Within 5 minutes | ☐ |
| 6 - 30 minutes | ☐ |
| 31 - 60 minutes | ☐ |
| After 60 minutes | ☐ |

16) Do you find it difficult to refrain from smoking in places where it is forbidden, e.g. in church, at the library, cinema, etc.?

(Check one)

Yes

☐

No

☐

17) Which cigarette would you hate most to give up?

(Check one)

The first one in the morning

☐

All others

☐

18) How many cigarettes a day do you smoke?

(Check one)

10 or less

☐

11 - 20

☐

21 - 30

☐

31 or more

☐

19) Do you smoke more frequently during the first hours after waking than during the rest of the day?

(Check one)

Yes

☐

No

☐

20) Do you smoke if you are so ill that you are in bed most of the day?

(Check one)

Yes

☐

No

☐

The following are some situations in which certain people might be tempted to smoke. Please indicate whether you are sure that you could refrain from smoking in each situation.

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutely sure
21) When I feel nervous.	1	2	3	4	5
22) When I feel depressed.	1	2	3	4	5
23) When I am angry.	1	2	3	4	5
24) When I feel very anxious.	1	2	3	4	5

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutely sure
25) When I want to think about a difficult problem.	1	2	3	4	5
26) When I feel the urge to smoke.	1	2	3	4	5
27) When having a drink with friends.	1	2	3	4	5
28) When celebrating something.	1	2	3	4	5
29) When drinking beer, wine or other spirits.	1	2	3	4	5
30) When I am with smokers.	1	2	3	4	5
31) After a meal.	1	2	3	4	5
32) When having coffee or tea.	1	2	3	4	5

If you were to quit smoking, how much support would you get from your partner, doctor and best friend? Circle one.

33) Partner	1 No Support	2	3 Some Support	4	5 Lots of Support
34) Doctor	1 No Support	2	3 Some Support	4	5 Lots of Support
35) Best Friend	1 No Support	2	3 Some Support	4	5 Lots of Support

How much pressure have you felt from the following people to quit smoking?

36) Partner	1 No pressure	2	3 Some pressure	4	5 Lots of pressure
37) Doctor	1 No pressure	2	3 Some pressure	4	5 Lots of pressure
38) Best Friend	1 No pressure	2	3 Some pressure	4	5 Lots of pressure

How important are each of the following people in your decision to quit smoking or reduce your smoking?

39) Partner	1 Not important	2	3 Somewhat important	4	5 Very important
40) Doctor	1 Not important	2	3 Somewhat important	4	5 Very important
41) Best Friend	1 Not important	2	3 Somewhat important	4	5 Very important

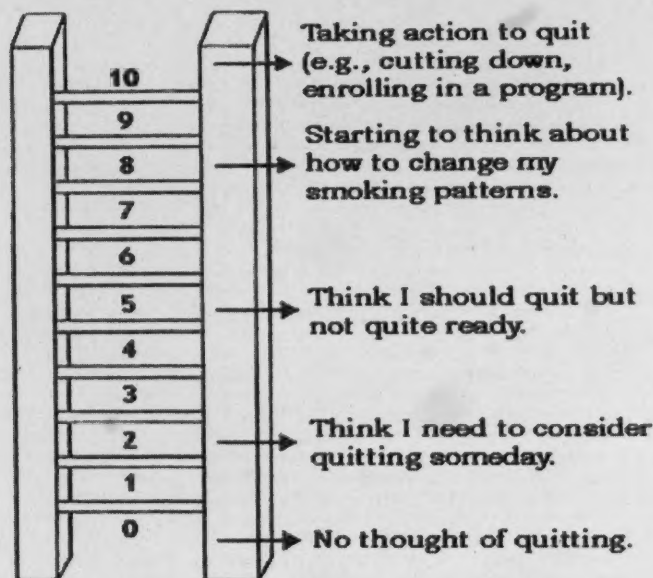
The following questions ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

In the last month...	Never	Almost never	Some- times	Fairly often	Very Often
42) How often have you been upset because of something that happened unexpectedly?	1	2	3	4	5
43) How often have you felt that you were unable to control the important things in your life?	1	2	3	4	5

In the last month...	Never	Almost never	Some- times	Fairly often	Very Often
44) How often have you felt nervous and "stressed"?	1	2	3	4	5
45) How often have you dealt successfully with irritating life hassles?	1	2	3	4	5
46) How often have you felt that you were effectively coping with important changes that were occurring in your life?	1	2	3	4	5
47) How often have you felt confident about your ability to handle your personal problems?	1	2	3	4	5
48) How often have you felt that things were going your way?	1	2	3	4	5
49) How often have you found that you could not cope with all the things that you had to do?	1	2	3	4	5
50) How often have you been able to control irritations in your life?	1	2	3	4	5
51) How often have you felt that you were on top of things?	1	2	3	4	5
52) How often have you been angered because of things that happened that were outside of your control?	1	2	3	4	5
53) How often have you found yourself thinking about things that you have to accomplish?	1	2	3	4	5
54) How often have you been able to control the way you spend your time?	1	2	3	4	5
55) How often have you felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

The next question asks about your readiness to quit smoking.

56) Each rung on the ladder represents where various smokers are in their thinking about quitting. Circle the number that indicates where you are now.



57) How likely is it that you will have a smoking-related illness (for example, lung cancer) at some time in the future?

1	2	3	4	5
definitely won't happen	probably won't happen	might happen	probably will happen	definitely will happen

58) How likely is it that you will have a smoking-related illness (for example, lung cancer) at some time in the future, compared to others your age?

1	2	3	4	5
definitely won't happen	probably won't happen	might happen	probably will happen	definitely will happen

59) In your opinion, is your smoking related to the reason you were admitted to the hospital?

Yes
No

(Check one)

☐
☐

Appendix 11

Orthopedic Patients Follow-up Questionnaire

**Tobacco Use Among Hospital Patients
Follow Up Survey**

Control Group
ID Code

Part 1-Smoking Status

1) How many cigarettes did you smoke today? _____ cigarettes

2) Think about the last 2 months. On the days that you smoked, how many cigarettes did you usually smoke?

(Circle one)

- | | |
|----------------------------------|---|
| 1-2 cigarettes in a day | 1 |
| 3-5 cigarettes in a day | 2 |
| 6-10 cigarettes in a day | 3 |
| 11-19 cigarettes in a day | 4 |
| 20-25 cigarettes in a day | 5 |
| More than 25 cigarettes in a day | 6 |

Questions 3 to 8 relate to the time since you have been in the hospital.

3) How many times have you tried to quit smoking since you were in the hospital?
_____ times

4) Did you try to quit on your own?

Yes	1
No	2

5) Have you tried treatment and/or programs to quit smoking?

Yes	1
No	2

6) What treatment and/or programs have you tried?

7) What factors helped you to decide to try this treatment and/or program?

Doctor	1
Family	2
Friend	3
Hospital brochure	4
Other	5

8) If you have stopped smoking since you went into the hospital, what is the greatest length of time that you've quit for? _____

Part 2-Smoking Cessation Information Package

The following questions ask about the smoking cessation information you received in the hospital prior to your discharge.

9) Have you had time to read this information?

Yes 1
No 2

10) Right after you completed the first questionnaire for this study, during your hospital stay, you were given two brochures on quitting smoking: "Help to Quit Smoking: Programs and Resources" and "There's Never Been a Better Time to Quit Smoking". The brochures were helpful:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

11) If you found these brochures helpful, can you tell me what you found helpful about them?

12) If you did not find these brochures helpful, can you tell me what was not helpful about them?

13) Did you receive any other booklets on quitting smoking before you left the hospital?

Yes 1
No 2

14) These brochures were helpful:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

15) If you found this information helpful, can you tell me what you found helpful about it?

16) If you did not find this information helpful, can you tell me what was not helpful about it?

17) When you were in the hospital, your questions about quitting smoking were adequately answered:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

If you were thinking of quitting smoking while you were in the hospital, comment on how helpful the following would have been for you:

18) Doctor's advice

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

19) Bedside counseling from a smoking cessation expert

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

20) Nicotine replacement therapy (e.g. the nicotine patch, nicotine gum)

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

21) Self-help manuals

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

22) Videotapes

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

23) Telephone support calls

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

24) What other help or information could have been given to you in the hospital with regards to smoking?

Appendix 12

Memo to Home Care Case Managers

To: Home Care Case Managers

From: Patti Seed
M.Sc. Candidate (Health Promotion)
Principal Investigator
University of Alberta

Date: Thursday August 15, 2002

Re: Psychosocial Predictors of Smoking Cessation Among Pneumonia Patients Study

As part of a Masters Degree in Health Promotion I am conducting a study that investigates clients who have community-acquired pneumonia and who are smokers. The intent of the study is to examine the effectiveness of smoking cessation literature provided to clients with active pneumonia. It also examines the impact of psychosocial factors known to relate to smoking on tobacco use among these subjects.

I am requesting your assistance to 1) identify eligible Home Care clients, 2) inform the client(s) of the study 3) obtain written client consent and 4) provide the client with the information needed to complete a questionnaire if the client agrees to participate.

Eligibility Criteria:

- 1.) Clients who have been recently diagnosed with pneumonia and who are receiving active treatment (i.e. antibiotics, home oxygen, etc.)
- 2.) Patients who understand and speak English.

Exclusion Criteria:

- 1.) Clients with a Mini Mental Status Exam score of less than 24/30.

Please note: It is not required that this exam be administered for the study. Previous test scores may be utilized with clients who have had the testing completed prior to the initiation of the study.

The Client Information Packages include:

- 1.) an information sheet
- 2.) the consent form - *please ensure the client signs this form, fax it to Patti and place it on the client's chart*
- 3.) a copy of the self-administered questionnaire and smoking cessation literature (two brochures)
- 4.) a pre-addressed and stamped envelope for the client to use to mail out the questionnaire

The client information packages will be kept in the Triage Office or designated area in each Home Care office. The information sheet explains the study in further detail. **The end date for collecting this data is December 31, 2002.**

If you have any questions, please do not hesitate to contact:

Thank you for your assistance.

Appendix 13

Home Care Patients Consent Form

Consent Form

Title of Project: Tobacco Use Among Hospital and Home Care Patients
Investigators: Patti Seed University of Alberta (MSc student), Dr. Cam
 Wild, University of Alberta Dr. Tom Marrie

Do you understand that you have been asked to be in a research study? Yes No

Have you read and received a copy of the attached Information Sheet? Yes No

Do you understand the benefits and risks involved in taking part in this research study? Yes No

Have you had an opportunity to ask questions and discuss the study? Yes No

Do you understand that you are free to refuse to participate or withdraw from the study at any time? You do not have to give a reason and it will not affect your care. Yes No

Has the issue of confidentiality been explained to you? Yes No

Do you understand who will have access to your records? Yes No

Do you agree to the Home Care Case Manager giving your name and telephone number to the researcher for a follow-up phone call in two months? Yes No

This study was explained to me by:

I agree to take part in this study. Yes No

 Signature of Research Participant

 Signature of Witness

 Date

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

 Signature of Investigator or Designee

 Date

Subject's Name _____

Phone Number _____

Call ☐ Day ☐ Evening ☐ Either

Appendix 14

Home Care Patients Baseline Questionnaire

Please return completed questionnaire in the pre-addressed and stamped envelope provided. Thank you!

HC Study ID Code _____

Pneumonia and Smoking Study**Part 1- About You**

1) What is your gender?

Female

(Check One)

☐

Male

☐

2) What is your age?

_____ years

3) What is your marital status?

Single

☐

Married

☐

Separated

☐

Divorced

☐

Widowed

☐

4) What is your highest level of education?

Elementary school

☐

Some high school

☐

High school graduate

☐

Some university

☐

University graduate

☐

Postgraduate

☐

5) What is your household income?

Below \$10 000

☐

Between \$11 000 and \$20 000

☐

Between \$21 000 and \$40 000

☐

Between \$41 000 and \$75 000

☐

Over \$75 000

☐**Part 2- Your Smoking**

6) On a typical day, how much do you smoke?

_____ cigarettes

7) How many cigarettes have you smoked today?

_____ cigarettes

8) Think about the last 30 days. On the days that you smoked, how many cigarettes did you usually smoke?

(Check one)

- | | |
|----------------------------------|--------------------------|
| 1-2 cigarettes in a day | ☐ |
| 3-5 cigarettes in a day | ☐ |
| 6-10 cigarettes in a day | ☐ |
| 11-19 cigarettes in a day | ☐ |
| 20-25 cigarettes in a day | ☐ |
| More than 25 cigarettes in a day | ☐ |

9) How old were you when you smoked your first cigarette? _____ years old

10) How many times have you tried to quit smoking in the past? _____ times

11) Did you try to quit on your own?

(Check one)

- | | |
|-----|--------------------------|
| Yes | ☐ |
| No | ☐ |

12) Have you tried treatment and/or programs to quit smoking?

(Check one)

- | | |
|-----|--------------------------|
| Yes | ☐ |
| No | ☐ |

13) What treatment and/or programs have you tried?

14) If you have stopped smoking in the past, what is the greatest length of time that you quit for?

15) How soon after you wake up do you smoke your first cigarette?

(Check One)

- | | |
|------------------|--------------------------|
| Within 5 minutes | ☐ |
| 6 - 30 minutes | ☐ |
| 31 - 60 minutes | ☐ |
| After 60 minutes | ☐ |

16) Do you find it difficult to refrain from smoking in places where it is forbidden, e.g. in church, at the library, cinema, etc.?

(Check one)

Yes

☐

No

☐

17) Which cigarette would you hate most to give up?

(Check one)

The first one in the morning

☐

All others

☐

18) How many cigarettes a day do you smoke?

(Check one)

10 or less

☐

11 - 20

☐

21 - 30

☐

31 or more

☐

19) Do you smoke more frequently during the first hours after waking than during the rest of the day?

(Check one)

Yes

☐

No

☐

20) Do you smoke if you are so ill that you are in bed most of the day?

(Check one)

Yes

☐

No

☐

The following are some situations in which certain people might be tempted to smoke. Please indicate whether you are sure that you could refrain from smoking in each situation.

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutel y sure
21) When I feel nervous.	1	2	3	4	5
22) When I feel depressed.	1	2	3	4	5
23) When I am angry.	1	2	3	4	5
24) When I feel very anxious.	1	2	3	4	5

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutel y sure
25) When I want to think about a difficult problem.	1	2	3	4	5
26) When I feel the urge to smoke.	1	2	3	4	5
27) When having a drink with friends.	1	2	3	4	5
28) When celebrating something.	1	2	3	4	5
29) When drinking beer, wine or other spirits.	1	2	3	4	5
30) When I am with smokers.	1	2	3	4	5
31) After a meal.	1	2	3	4	5
32) When having coffee or tea.	1	2	3	4	5

If you were to quit smoking, how much support would you get from your partner, doctor and best friend? Circle one.

33) Partner	1 No Support	2	3 Some Support	4	5 Lots of Support
34) Doctor	1 No Support	2	3 Some Support	4	5 Lots of Support
35) Best Friend	1 No Support	2	3 Some Support	4	5 Lots of Support

How much pressure have you felt from the following people to quit smoking?

36) Partner	1 No pressure	2	3 Some pressure	4	5 Lots of pressure
37) Doctor	1 No pressure	2	3 Some pressure	4	5 Lots of pressure
38) Best Friend	1 No pressure	2	3 Some pressure	4	5 Lots of pressure

How important are each of the following people in your decision to quit smoking or reduce your smoking?

39) Partner	1 Not important	2	3 Somewhat important	4	5 Very important
40) Doctor	1 Not important	2	3 Somewhat important	4	5 Very important
41) Best Friend	1 Not important	2	3 Somewhat important	4	5 Very important

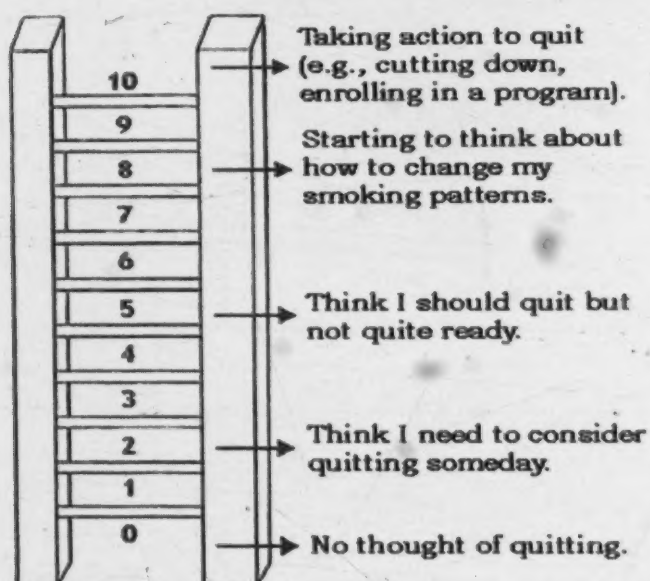
The following questions ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

In the last month...	Never	Almost never	Some- times	Fairly often	Very Often
42) How often have you been upset because of something that happened unexpectedly?	1	2	3	4	5
43) How often have you felt that you were unable to control the important things in your life?	1	2	3	4	5

In the last month...	Never	Almost never	Some- times	Fairly often	Very Often
44) How often have you felt nervous and "stressed"?	1	2	3	4	5
45) How often have you dealt successfully with irritating life hassles?	1	2	3	4	5
46) How often have you felt that you were effectively coping with important changes that were occurring in your life?	1	2	3	4	5
47) How often have you felt confident about your ability to handle your personal problems?	1	2	3	4	5
48) How often have you felt that things were going your way?	1	2	3	4	5
49) How often have you found that you could not cope with all the things that you had to do?	1	2	3	4	5
50) How often have you been able to control irritations in your life?	1	2	3	4	5
51) How often have you felt that you were on top of things?	1	2	3	4	5
52) How often have you been angered because of things that happened that were outside of your control?	1	2	3	4	5
53) How often have you found yourself thinking about things that you have to accomplish?	1	2	3	4	5
54) How often have you been able to control the way you spend your time?	1	2	3	4	5
55) How often have you felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

The next question asks about your readiness to quit smoking.

56) Each rung on the ladder represents where various smokers are in their thinking about quitting. Circle the number that indicates where you are now.



57) How likely is it that you will have a smoking-related illness (for example, lung cancer) at some time in the future?

1	2	3	4	5
definitely won't happen	probably won't happen	might happen	probably will happen	definitely will happen

58) How likely is it that you will have a smoking-related illness (for example, lung cancer) at some time in the future, compared to others your age?

1	2	3	4	5
definitely won't happen	probably won't happen	might happen	probably will happen	definitely will happen

59) In your opinion, is your smoking related to your pneumonia?

(Check one)

Yes
No

☐
☐

60) What are your thoughts about smoking and pneumonia?

Thank you very much for completing the questionnaire!
Remember: all of your answers are completely anonymous

Appendix 15

Home Care Patients Follow-up Questionnaire

**Tobacco Use Among Pneumonia Patients
Follow Up Survey**

Home Care
ID Code

Part 1-Smoking Status

1) How many cigarettes did you smoke today? _____ cigarettes

2) Think about the last 2 months. On the days that you smoked, how many cigarettes did you usually smoke?

(Circle one)

1-2 cigarettes in a day	1
3-5 cigarettes in a day	2
6-10 cigarettes in a day	3
11-19 cigarettes in a day	4
20-25 cigarettes in a day	5
More than 25 cigarettes in a day	6

Questions 3 to 8 relate to the time since you caught pneumonia.

3) How many times have you tried to quit smoking since you caught pneumonia?
_____ times

4) Did you try to quit on your own?

Yes	1
No	2

5) Have you tried treatment and/or programs to quit smoking?

Yes	1
No	2

6) What treatment and/or programs have you tried?

7) What factors helped you to decide to try this treatment and/or program?

Doctor	1
Family	2
Friend	3
Hospital brochure	4
Other	5

8) If you have stopped smoking since you caught pneumonia, what is the greatest length of time that you've quit for? _____

Part 2-Smoking Cessation Information Package

The following questions ask about the smoking cessation information you received from your Home Care case manager.

9) Have you had time to read this information?

Yes 1
No 2

10) When the Home Care case manager gave you the first questionnaire for this study, you were given two brochures on quitting smoking: "Help to Quit Smoking: Programs and Resources" and "There's Never Been a Better Time to Quit Smoking". The brochures were helpful:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

11) If you found these brochures helpful, can you tell me what you found helpful about them?

12) If you did not find these brochures helpful, can you tell me what was not helpful about them?

13) Did you receive any other booklets on quitting smoking from Home Care?

Yes 1
No 2

14) These brochures were helpful:

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

15) If you found this information helpful, can you tell me what you found helpful about it?

16) If you did not find this information helpful, can you tell me what was not helpful about it?

If you were thinking of quitting smoking after you caught pneumonia, comment on how helpful the following would have been for you:

17) Doctor's advice

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

18) Counseling from a smoking cessation expert

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

19) Nicotine replacement therapy (e.g. the nicotine patch, nicotine gum)

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

20) Self-help manuals

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

21) Videotapes

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
1	2	3	4	5

22) Telephone support calls

Strongly Agree	Agree	Neither Agree/Disagree	Disagree	Strongly Disagree
-------------------	-------	------------------------	----------	----------------------

1	2	3	4	5
---	---	---	---	---

23) What other help or information could have been given to you with regards to smoking?
